Council Members
Chairman Allan Birchfield
Cr Stuart Challenger (Deputy)
Cr Brett Cummings
Cr Peter Ewen
Cr Debra Magner
Cr Laura Coll McLaughlin
Cr John Hill

Iwi Representatives
Francois Tumahai (Ngati Waewae)
Jackie Douglas (Makaawhio)

THE WEST COAST
REGIONAL COUNCIL

Meeting of Council
(Te Huinga Tu)

Tuesday, 10 August 2021

West Coast Regional Council Chambers, 388 Main South Road, Greymouth
and
Live Streamed via Council's Facebook Page

10.30 am **Council Meeting**

On Completion of Council Meeting **Resource Management Committee Meeting**

On Completion of Resource Management Meeting

Council Meeting
(Te Huinga Tu)

A G E N D A
(Rarangi Take)

1. Welcome *(Haere mai)*

2. Apologies *(Nga Pa Pouri)*

3. Declarations of Interest

4. Public Forum, Petitions and Deputations *(He Huinga tuku korero)*
   Mr Alex Wood
   Mr Paul Findlay

5. Confirmation of Minutes *(Whakau korero)*

   - Council Meeting 13 July 2021

6. Chairman's Report

7. Chief Executive's Report

   - Monthly Update

8. **Reports**

   - Twelve Month Review
   - Terms of Reference
   - West Coast Emergency Management July Flood Event Response
   - Position of West Coast Regional Council in the Climate Change Debate
   - Operations Report
   - Ownership of the Greymouth Floodwall
   - Greymouth Floodwall Seepage Report
   - Draft Asset Management Plans & Summary of Rating District Consultation Topics

9. General Business

Purpose of Local Government
The reports contained in this agenda address the requirements of the Local Government Act 2002 in relation to decision making. Unless otherwise stated, the recommended option promotes the social, economic, environmental and cultural well-being of communities in the present and for the future.

Health and Safety Emergency Procedure
In the event of an emergency, please exit through the emergency door in the Council Chambers.
If you require assistance to exit, please see a staff member. Once you reach the bottom of the stairs make your way to the assembly point at the grassed area at the front of the building. Staff will guide you to an alternative route if necessary.

H. Mabin
Acting Chief Executive

COUNCIL MEETING

THE WEST COAST REGIONAL COUNCIL

MINUTES OF THE MEETING OF THE COUNCIL HELD ON 13 JULY 2021, AT THE OFFICES OF THE WEST COAST REGIONAL COUNCIL, 388 MAIN SOUTH ROAD, GREYMOUTH, COMMENCING AT 10.35 A.M

PRESENT:

A. Birchfield (Chairman), S. Challenger, P. Ewen, D. Magner, B. Cummings, J. Hill, L. Coll McLauglin, J. Douglas, F. Tumahai

IN ATTENDANCE:

H. Mabin (Acting Chief Executive), C. Helem (Acting Consents & Compliance Manager), N. Costley (Strategy & Communications Manager), R. Beal (Operations Director) via Zoom, J. Armstrong (Te Tai o Poutini Project Manager) via Zoom, N. Selman (Financial Consultant) via Zoom, T. Jellyman (Minutes Clerk), The Media.

Cr Birchfield read the prayer

1. WELCOME

2. APOLOGIES

There were no apologies.

3. DECLARATION OF INTEREST

The Chairman called for declarations of interests. There were no declarations of interest.

4. PUBLIC FORUM

There was no public forum.

5.0 CONFIRMATION OF MINUTES

The Chairman asked the meeting if there were any changes to the minutes of the previous meeting.

Moved (Ewen / Coll McLauchlan) *that the minutes of the Council meeting dated 9 June 2021, be confirmed as correct.*

Carried

Matters arising

There were no matters arising.

REPORTS:

6.0 CHAIRMANS REPORT

The Chairman took his report as read and offered to answer questions.

Cr Hill spoke of the recent meeting at Shantytown, which Cr Birchfield attended that was held by Development West Coast. Cr Hill stated that it was noted that Cr Birchfield did not attend Lisa Tumahai's climate change presentation. Cr Hill stated he feels it is time that climate change is brought to the Council table for discussion, and that this Council acknowledges anthropogenic climate change. Cr Hill would like Council to have a vote to see whether or not this is the only council in New Zealand that does not acknowledge anthropogenic climate change. It was agreed this matter would be put on the August Council agenda.

Moved (Magner / Hill) *That this report is received.*

Carried

7.0 ACTING CHIEF EXECUTIVE'S REPORT

H. Mabin spoke to her report and took it as read. She drew attention to the response from Hon Damien O'Connor regarding the letter Council sent him regarding the proposed NES for Freshwater Regulations 2020 and the NPS for Freshwater Management. Cr Ewen expressed his disappointment with the Minister's response as Council has passed on these issues many times and the affect they have on the West Coast. Cr Ewen stated that the Minister is well aware of the unique circumstances the West Coast faces and yet the West Coast is not making any progress on this.
Cr Hill asked if there are any partnership opportunities with Fonterra following the 11 June meeting. H. Mabin advised she responded that this was a Zoom meeting, with Fonterra reaching out to regional councils to see if they could be more proactive in helping with pasture and river management. H. Mabin stated that both Environment Southland and Otago Regional Councils are keen to work on these matters. Cr Magner advised that ongoing conversations with Westland Milk Products and farmers around this and a proactive group is being created. N. Costley confirmed that she attended a meeting with Westland Milk Products and other stakeholders regarding this issue.

Moved (Challenger / Magner) *That this report is received.*

Carried

8.0 MINUTES OF RISK AND ASSURANCE COMMITTEE

H. Mabin spoke to this report and advised that these are the draft minutes from the Risk & Assurance meeting, which at the time of this meeting, was known as the Audit & Risk Committee. During this meeting the Committee resolved to change its name to Risk & Assurance Committee. H. Mabin advised that the minutes are for noting only by Council, and will go back to the next Risk & Assurance Committee meeting for adoption by the Risk & Assurance Committee.

Moved (Magner / Challenger) *That the minutes of the Risk and Assurance Committee dated 21 June are noted.*

Carried

8.1 DELEGATION OF AUTHORITY – JBWERE INVESTMENT PORTFOLIO

H. Mabin spoke to this report and advised that as a result of the Risk & Assurance meeting there are two papers on this agenda. She outlined the content of the papers.
Cr Coll McLaughlin raised the matter of having two signatories. It was agreed that two signatories will be included in the Delegations Manual for both the Investment Portfolio and the LGFA borrowing.

Moved (Coll McLaughlin / Cummings)

It is recommended that the Council resolve to amend the existing Council Officers by:

- *Approve the removal of Michael Meehan as a Council Officer on JBWere's Statement of Investment Policy and Objectives; and*
- *Note that Robert Mallinson will be a Council Officer on JBWere's Statement of Investment Policy and Objectives until 27 August 2021.*

It is recommended that the Council resolve to:

- *Approve the inclusion of Heather Mabin as a Council Officer on JBWere's Statement of Investment Policy and Objectives; and*
- *Approve the inclusion of Chair Allan Birchfield as a Council Officer on JBWere's Statement of Investment Policy and Objectives; and*
- *Approve the inclusion of Cr Debra Magner, Chair Risk & Assurance Committee, as a Council Officer on JBWere's Statement of Investment Policy and Objectives.*

Carried

8.2 DELEGATION OF AUTHORITY – LOCAL GOVERNMENT FUNDING AGENCY

H. Mabin spoke to this report and advised the purpose is to establish signatories for borrowing from the Local Government Funding Agency.

Moved (Coll McLaughlin / Cummings)

It is recommended that the Council resolve to:

- *Approve the inclusion of Heather Mabin as a West Coast Regional Council signatory with LGFA; and*
- *Approve the inclusion of Chair Allan Birchfield as a West Coast Regional Council signatory with LGFA; and*
- *Approve the inclusion of Cr Debra Magner, Chair Risk & Assurance Committee as a West Coast Regional Council signatory with LGFA.*

Carried

8.3 OPERATIONS REPORT

R. Beal spoke to this report and took it as read. He offered to answer questions.
Cr Birchfield noted that there is a lot of rock stockpiled at Camelback Quarry. He asked if this figure is correct. R. Beal advised that the end of year stock take was done last week and confirmed that this figure is correct. R. Beal confirmed that the concrete sections placed on the Punakaiki seawall was utilised from the footpath that is being re-sealed. Cr Ewen commented that the seawall is adjacent to a National Park, and there has been four different rock sources used on the protection in this area, from four different geologies. Cr Ewen stated that this is a pointer to what is permissible in this area. It was noted that rock has also come from Charleston and the Meybille Bay slip.

Moved (Cummings / Magner) *that the report is received.*

Carried

8.4 LATE ITEM – SUMMARY ANNUAL REPORT 2020

H. Mabin spoke to this report and advised that this includes the Printers Copy of the Annual Report 2020, and the Audited Summary Annual Report.

Moved (Magner / Hill)

It is recommended that the Council resolve to:

- *Adopt the West Coast Regional Council's Summary Annual Report 2020; and*
- *Receive the Printers Copy of the West Coast Regional Council's Annual Report.*

Carried

GENERAL BUSINESS

There was no general business.

Moved (Magner / Cummings)

That the Confidential section of the Council meeting is moved to the end of the Resource Management Committee meeting.

Carried

The meeting closed at 11.52 a.m.

.....
Chairman

.....
Date

Report to: Council/Committee	**Meeting Date:** 10 August 2021
Title of Item: Chairman's Report	
Report by: Chairman Allan Birchfield	
Reviewed by:	
Public excluded? No	

Purpose

For Council to be kept informed of meetings and to provide an overview of current matters.

Summary

This is the Chairman's report for July 2021.

Meetings attended:

- I attended the Te Tai o Pountini Plan committee meeting on 26 July at Grey District Council.
- On 28 July I briefed management and staff and informed them that I had received Vin Smith's formal resignation.
- I attended the West Coast Combined Governance Workshop on 29 July held at the Arahura Marae.

Attachment

I received a letter on 3 August from Mayor Smith, Westland District Council, regarding Flood Protection Works- Hokitika River Mouth to Kaniere Bridge.

Recommendation

That this report is received.

OFFICE OF THE MAYOR

His Worship the Mayor
Bruce Smith
Westland District Council
36 Weld Street, Private Bag 704,
Hokitika 7842

P: 021 922 860
E: mayor.smith@westlanddc.govt.nz

FILE REF: CCL 7

3 August 2021

Allan Birchfield
Chairman
West Coast Regional Council
Greymouth

Via Email: birch.min@xtra.co.nz

Dear Allan

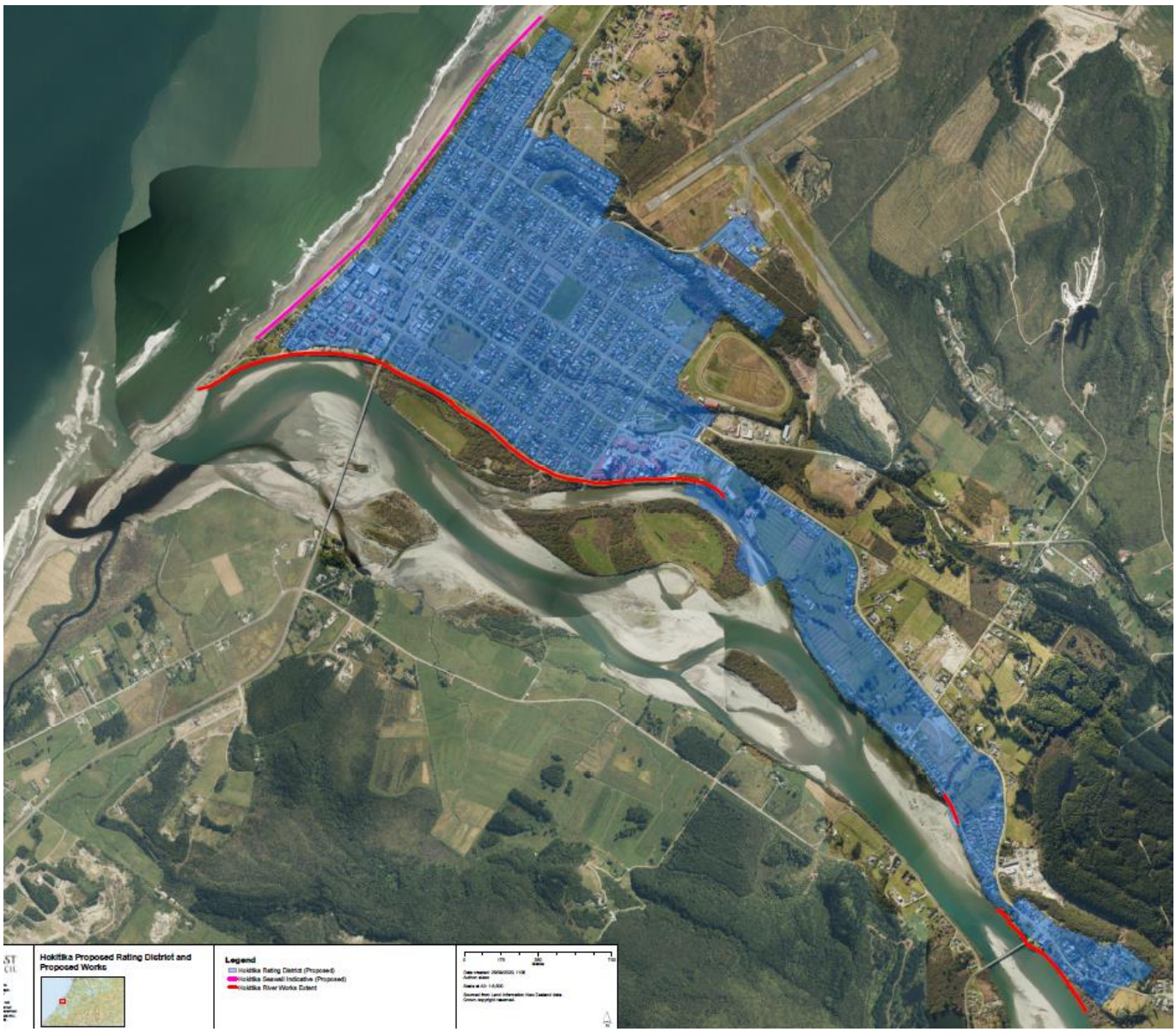
FLOOD PROTECTION WORKS – HOKITIKA RIVER MOUTH TO KANIERE BRIDGE

The Westland District Council held their Ordinary Council Meeting on Thursday 29 July 2021. The topic of the Seawall and River protection works was raised following a meeting with West Coast Regional Council (WCRC) staff and our CE earlier in the week. After a lot of discussion, we would like to encourage the West Coast Regional Council to act with urgency in regards to the Hokitika river protection works.

We realise that the funding for the protection works covers both river and sea protection but would like to stress that we would like the river protection works to begin for the priority risk areas as soon as possible. We do not see the requirement to wait for the full design of the sea protection, resource consent and costing as this will delay river protection works by at least 3-6 months. We do understand that WCRC will need to understand the financial implications of the full project, however the fact that the high risk areas on the river are only 40% of the total proposed river protection works. From our understanding these risk areas on the river are from the Westland Milk Products Ltd factory site to Kaniere Bridge.

The recent events in Westport with the one-in-100 year flood event, have highlighted the need for this project to be undertaken with urgency and we look forward to this matter progressing. The Hokitika Township as it stands currently is at risk of being potentially inundated with floodwaters and raising the stopbanks is considered imperative to protect the community which is at risk of a stopbank breach.

We refer to the map provided below:



Sincerely

Bruce Smith
Mayor

BS/DM

Report to: Council	**Meeting Date: 10 August 2021**
Title of Item: CEO's report	
Report by: Heather Mabin, Acting Chief Executive	
Reviewed by:	
Public excluded? No	

Report Purpose

The purpose of this paper is to provide Council with transparency around the meetings that the Acting Chief Executive has been involved in and to provide Council with an overview of current matters.

Report Summary

This paper details the interactions, appointments, significant contracts executed, and meetings attended by the Acting Chief Executive to 31 July 2021.

Draft Recommendations

It is recommended that Council resolve to:

Receive this report.

Issues and Discussion

Current situation

Activities undertaken from 6 July 2021 to 31 July 2021 by Heather Mabin were:

- July 7
  - Attended a Risk Workshop with elected members and senior staff facilitated by Philip Jones.
- July 8
  - Signed Variation to OCS Ltd Services contract to include the cleaning of Jacks Rd Depot.
- July 13
  - Signed agreement with Inclement for the development of a tool for CDEM purposes around Household preparedness.
- July 14
  - Held a debrief of Council staff regarding Council meeting on 13 July
- July 15 & 16
  - Attended the LGNZ Conference in Blenheim.
- July 16
  - Attended via Zoom 10 a.m. Severe Weather Event Agency Briefing
- July 17
  - Attended via Zoom 9 a.m. Severe Weather Event Agency Briefing
  - Attended via Zoom 5 p.m. Severe Weather Event Agency Briefing
- July 18
  - Attended via Zoom 9 a.m. Severe Weather Event Agency Briefing
  - Attended via Zoom midday Special meeting of CDEM Joint Committee
- July 22
  - Attended LGFA Shareholder Borrower Day in Wellington

- July 25
    - Volunteered to help in the Welfare section of ECC in Westport – this time has not been claimed through my timesheets.
- July 26
    - Attended Te Tai o Poutini Plan Committee meeting
    - Attended via Zoom South Island Regional Council CEO meeting
- July 27
    - Signed the Reporting Certificate as at 30 June for the Covenant Trustees Services Ltd with regard to the Debenture Trust Deed.
    - Attended the Workshop on RMA Changes and draft submission on the proposed Natural & Built Environment Bill
    - Met with representatives from Westland District Council about the Hokitika Seawall.
- July 31
    - Represented Council at the Sod-turning Event at the Dolomite Point Redevelopment Project for the commencement of construction.

Considerations

Implications/Risks

Transparency around the activities undertaken by the Acting Chief Executive is intended to mitigate risks associated with Council's reputation due to the need for her appointment.

Significance and Engagement Policy Assessment

There are no issues within this report which trigger matters in this policy.

Report to: Council/Committee	**Meeting Date:** 10 August 2021
Title of Item: Twelve Month Review – 1 July 2020 – 30 June 2021	
Report by: Heather Mabin, Acting Chief Executive	
Reviewed by:	
Public excluded? No	

Purpose

Attached is the Twelve Month Review showing progress for the full 12 months of the financial year to 30 June 2021.

Summary

This report shows achievements as measured against the levels of service and performance targets in the Annual Plan 2020 – 2021.

Recommendation

It is recommended that Council resolve to receive this report.

Governance Performance Targets

Levels of Service	Measure	Performance Target	Progress Achieved
Maintain a Council of elected representatives in accordance with statutory requirements and in a manner that promotes effective decision-making, transparency, and accountability to the West Coast regional community	Number of public meetings held and individual Councillor attendance	Conduct eleven monthly meetings of Council and the Resource Management Committee, plus other scheduled meetings and scheduled workshops during the year with at least 80% attendance by all Councillors.	Councillor / Attendance / % Birchfield 17 out of 17 100% Ewen 17 out of 17 100% Cummings 17 out of 17 100% Challenger 16 out of 17 94 % Magner 17 out of 17 100% Hill 17 out of 17 100% Coll McLaughlin 16 out of 17 94%
	Compliance with statutory timeframes	Prepare and notify the Council's Annual Plan Statement of Proposal by 31 May each year, and the Annual Report by 31 October, in accordance with the procedures outlined in the Local Government Act 2002.	Not achieved. The audited Annual Report for the year to 30 June 2020 was only adopted by Council on 9 June 2021. Achieved. The Annual Plan 2020 / 21 was adopted by Council on 30 June 2020.
	Timing and number of newsletters, and internet website based information related to public consultation processes.	Publish an informative Council newsletter twice a year to be circulated to all ratepayers, with their rate demand, in March and September and ensure required information is posted on the Council website when Council invites submissions on a new or revised policy document.	Achieved. The rates instalments which were sent out in September 2020 and in March 2021. They contained the usual newsletter. Council's website / social media continues to be updated whenever submissions are invited on new or revised policy document.
Continue to support the contribution our two West Coast Runanga make to Council's decision-making processes; and continue to seek contributions from other Maori	Attendance of Iwi appointees at Resource Management Committee meetings	Continue to invite attendance of Makaawhio and Ngati Waewae representatives as appointees to the Council's resource management committee, to enable Maori participation in resource management decision-making.	Achieved. Council has continued to invite both Makaawhio and Ngati Waewae representatives to attend all Resource Management Committee meetings. Council and Poutini Ngāi Tahu signed off the Mana Whakahono ā Rohe - Iwi Participation Arrangement on 22 October 2020 at the Arahura Marae. This is a collaboration between Te Rūnanga o Ngāti Waewae, Te Rūnanga o Makaawhio, Te Rūnanga o Ngāi Tahu, and West Coast Regional Council. This Arrangement formally acknowledges the partnership and relationship between Council and Poutini Ngāi Tahu.

Resource Management Performance Targets

<table>
<tr><th>Levels of Service</th><th>Measure</th><th>Performance Target</th><th>Progress Achieved</th></tr>
<tr><td rowspan="2">To maintain or enhance water quality in the West Coast's rivers</td><td>State of the Environment Monitoring:
Ammoniacal nitrogen, periphyton, clarity, turbidity and faecal coliforms are measured quarterly at 38 river sites. These parameters characterise the water quality of West Coast rivers and have been measured since 1996.</td><td>Maintaining or improving trends for these parameters.</td><td>Not Achieved
<table><tr><td></td><td>% sites improving</td><td>% sites declining</td><td>% sites no change</td></tr><tr><td>Ammonia-N</td><td>48.6</td><td>0.0</td><td>51.4</td></tr><tr><td>Clarity</td><td>21.6</td><td>18.9</td><td>59.5</td></tr><tr><td>Faecal Coliforms</td><td>8.1</td><td>24.3</td><td>67.6</td></tr><tr><td>Turbidity</td><td>21.6</td><td>8.1</td><td>70.3</td></tr></table></td></tr>
<tr><td>Compliance Monitoring for Discharges:
The number of compliant or non-compliant point source discharges to water, or discharges likely to enter water; and council's response to any non-compliance.</td><td>All significant consented discharges[1] are monitored at least annually, and all dairy sheds at least every second year depending on individual compliance record. All non-compliances publicly reported to the Resource Management Committee and responded to using Council's Compliance & Enforcement Policy.</td><td>Achieved which include 229 mine site inspections undertaken.
The dairy target has been achieved with 290 inspections undertaken within the 20/21 milking season.
All non-compliances have been reported as per the target.</td></tr>
<tr><td>To maintain or enhance the water quality in Lake Brunner</td><td>The trophic state of Lake Brunner is measured by the Trophic Level Index (TLI) which combines clarity, nutrient and algal measures. The rolling 5-year mean is compared with a 2002-2006 baseline mean.</td><td>The annual (rolling 5-year mean) TLI of Lake Brunner is less than the 2002-2006 TLI baseline mean of 2.79.</td><td>Not achieved. The TLI for Apr 2016 – Apr 2021 (latest results) is 2.82..</td></tr>
<tr><td>Complete current regional plans to operative stage, and review them to maintain their community acceptability.</td><td>Statutory requirements for review</td><td>Compliance with statutory requirements for the review of Council's plans and strategies.</td><td>Achieved: Regional Policy Statement made operative in July 2020.
Plan Change 1 to the Land and Water Plan, excluding the Lake Kini wetland boundaries on Māori reserve land, made operative in October 2020.
Preliminary work on freshwater plan changes to the RPS and Land and Water Plan commenced January 2021.</td></tr>
<tr><td>Advocate for the West Coast interests when external environmental policymaking may affect the West Coast.</td><td>Number of submissions made and number of successful advocacy outcomes.</td><td>Submit on all central or local government discussion documents, draft strategies, policies or Bills that may impact on West Coast interests, within required timeframes.</td><td>Achieved. Two submissions lodged on the Water Services Bill, and a MFE Discussion Document: "Phasing out fossil fuels in process heat".</td></tr>
</table>

[1] Significant Consented Discharge includes: any consented discharge from a municipal sewage scheme or landfill, any consented discharge from a working mine site, any consented discharge of dairy effluent to water, and any large scale industrial discharge (WMP, Kokiri)

Resource Management Performance Targets

Levels of Service	Measure	Performance Target	Progress Achieved
To maintain or enhance the life supporting capacity and amenity value of the West Coast's rivers	Stream ecosystem health: Instream macroinvertebrate community health (SQMCI) scores are measured at 29 river sites. The values for each site are calculated using five year rolling means and comparing them to baseline means calculated from data from 2005-2009.	Macroinvertebrate health index[2] (SQMCI) mean is higher, or no more than 20% lower, than the baseline mean.	Not achieved. Four out of 26 sites have not met the criteria and are lower than the baseline
	Bathing beach sampling: 18 swimming sites are sampled, ten times per summer season (fortnightly) for E coli (moderate-high risk > 550) or Enterococci (moderate-high risk > 280).	Scheduled swimming sites do not exceed the moderate-high risk threshold on more than 10% of sampling occasions.	Not achieved. Four out of 18 sites have not met the target. During 2020-2021 season Hokitika Beach, Seven Mile Creek, Rapahoe Beach, and Shingle Beach, exceeded the moderate-high risk category more than 10% of the time.
To protect human health from adverse impacts of poor groundwater quality.	28 Wells are monitored at least twice annually, 24 of which are used for human consumption. The guideline of 11.3mg/L of nitrate is used to protect human health, particularly for babies. The data from the year is averaged before comparing against the 11.3mg guideline.	In wells used for human consumption, nitrate levels remain below the health guideline of 11.3 mg/L.	Achieved. Averaged over Summer 2021 and Winter 2021, all of 24 wells used for human consumption were within guidelines. Data for NGMP wells only available up to Autumn 2021.
To protect human health from any adverse impacts of poor air quality in Reefton.	Reefton's air is monitored in accordance with the National Environmental Standard (NES) for air quality by measuring PM_{10} (airborne particles smaller than ten micrometers, which affect human respiration). The threshold is a 24hr mean PM_{10} of 50 micrograms/m^3.	NES Requirement: 24hr PM_{10} values do not exceed the NES threshold more than three times in one year, between 2016 & 2020; whereas after 2020 only 1 exceedance per year is allowed.	Achieved (to date, 28 July 2021). There have been no exceedances of the National Environmental Standard for Air Quality so far in Winter 2021.
Respond to all genuine incident complaints received by the Council and take enforcement action where needed.	Number of complaints received and number of enforcement actions resulting from these.	Operate a 24-hour complaints service, assess and respond to all genuine complaints within 24 hours and non-urgent complaints within 5 working days in accordance with Council's Compliance & Enforcement Policy.	Achieved. 24 hours' complaint service has operated throughout the reporting period. All actions undertaken were in accordance with the Council's Compliance and Enforcement Policy, and reported to Resource Management Committee. 17 infringement notices, 15 abatement notices and 10 formal warnings were issued throughout the reporting period.

Compliance with the consent processing timeframes in the RMA and mining legislation.	Compliance with discounting regulations and mining timeframes	Process all resource consent applications without incurring any cost to Council due to the RMA discounting regulations; and process at least 95% of mining work programmes[3] within 20 working days of receipt.	Not achieved. Discounting has been applied to one resource consent. This was a historic application which has now been resolved. All other consents meet the RMA timeframes. 100% of mining work programmes submitted were processed within the 20-day timeframe. There were 69 mining work programmes received
Respond to marine oil spills in coastal waters in accordance with the Tier 2 Oil Spill Response Plan and maintain readiness for spill response.	Timing of responses & number of trained staff	Respond within 4 hours to all spills, using Council or MNZ spill equipment to contain spills; plus ensure at least 10 trained responders.	Achieved: One spill occurred during the reporting period June 2021 sinking of the Humma fishing vessel which was responded to within 4 hours. Maritime NZ requirements now state that ten staff are required. There are 12 trained responders.

[2] This macroinvertebrate index uses comparative samples of aquatic invertebrates to evaluate water quality, based on the type and tolerances of invertebrates (bugs) found at that site and how those communities of invertebrates may change over time. Some bug species are pollution tolerant while others are pollution sensitive, so the mix of species tells us a lot about the water quality at the site.
[3] This target assumes the work programme is submitted with all necessary information provided.

Regional Land Transport

Level of Service	Measure	Performance Target	Progress Achieved
Maintain a Regional Land Transport Plan in compliance with relevant legislation and acceptable to our West Coast community.	An Operative Regional Land Transport Plan	Compliance with statutory requirements for the preparation, review and implementation of the Regional Transport Plan and Passenger Transport Plan.	Achieved.

Hydrology and Flood Warning Services

Level of Service	Measure	Performance Targets	Progress Achieved
Continue to provide flood warning to assist communities to assess risk of impending floods, for the six rivers (Karamea, Mokihinui, Buller, Grey, Hokitika, and Waiho).	Staff response to high flow events.	Provide flood monitoring service for the six rivers monitored (Karamea, Buller, Mokihinui, Grey, Hokitika, Waiho) and respond in accordance with the floodwarning manual.	Achieved.
	Availability of information about high flow events.	Ensure data on river levels (Karamea, Buller, Grey, Hokitika, Waiho, Mokihinui) is available on the Council website (updated 12 hourly, or 3 hourly during flood events) > 90% of the time.	Achieved.

Civil Defence Emergency Management

Levels of Service	Measure	Performance Targets	Progress Achieved
Maintain a Civil Defence Plan that delivers efficient and effective management of the region's civil defence functions in compliance with the legislation and is acceptable to West Coast community desires.	Civil Defence Plan always operative.	Compliance with statutory requirements for the preparation, review and implementation of the Group CDEM Plan.	Achieved.
	Number of trained staff	Ensure at least 30 Council staff are trained as Emergency Coordination Centre (ECC) personnel so that we have three shifts of ECC staff trained and exercised in case of a regional emergency.	Ongoing Fifty-one staff are enrolled in the training register, with a mix of either foundation or intermediate level qualifications.

Quarry Performance Targets

Levels of Service for Quarries	Measure	Performance Targets	Progress Achieved
Ensure efficient and effective management and safe operation of Council's quarries, delivering rock to any customers within ten working days with priority given to Council rating district customers.	Timing of delivering on rock requests.	Deliver on requests for rock within two weeks, and ensure sufficient stockpiled rock is available where practical.	Achieved.
	Number of site inspections to monitor contractor health and safety and performance	Visit each active quarry site at least twice a year, when contractors are working the quarry (where possible), to ensure Health and Safety standards and other permit requirements are being adhered to.	Achieved.

Rating District Performance targets

Levels of Service	Measure	Performance Targets	Progress Achieved
Meet or exceed the flood protection, drainage or erosion protection levels as described in the levels of service described in the Long Term Plan.	Completion of rating district inspections, works reports and consultation meetings (where material works are proposed).	Complete all asset inspections, works reports, and rating district meetings. Perform all capital and maintenance works as agreed at those meetings.	On track to achieve.
	Proportion of schemes performing to their agreed service level.	Monitor all rating district infrastructural assets to ensure they perform to the service level consistent with the Asset Management Plan of each Rating District, or whatever level the community has decided is an acceptable risk.	Achieved.
	Meet timeframes for plan review	Review Rating District Asset Management Plans every third year, or earlier where information indicates a significant change from what is stated in the Plan.	On track to achieve.

VCS Performance targets

Levels of Service	Measure	Performance Targets	Progress Achieved
To produce a financial surplus (to offset general rates) by tendering for & delivering on vector control contracts and other contracts.	Achieve or exceed budgeted financial return	Tender for, and win, sufficient contracts to provide or exceed the annual budgeted return to Council.	On track to achieve.
To provide marine oil spill and terrestrial hazardous substance spill support, and biosecurity response services for the MNZ, MAF and the Regional Council.	Availability of trained staff	Have staff available as a response unit for marine and terrestrial pollution spill events as per the MOU dated 11 November 2005.	Achieved.
	Availability of trained staff	Have 4 staff plus a vehicle available for biosecurity emergencies, as per the National Biosecurity Capability Network agreement 2011.	Achieved.

Report to: Council	**Meeting Date: 10 August 2021**
Title of Item: Council Committees – Terms of References	
Report by: Heather Mabin, Acting Chief Executive	
Reviewed by:	
Public excluded? No	

Report Purpose

The purpose of this paper is to table for adoption amended *Terms of Reference* for the Council's two Committees, the Resource Management Committee and the Risk & Assurance Committee.

Report Summary

Since early 2021, the Council's Delegations Manual (DM) has been under review by both Staff and elected members. Included in the DM are extracts from the *Terms of Reference* for Council's Committees.

The review identified revisions to these *Terms of Reference* that are tabled for formal adoption.

Draft Recommendations

It is recommended that Council resolve to:

- Adopt the revised Resource Management Committee – Terms of Reference
- Adopt the revised Risk & Assurance Committee – Terms of Reference

Considerations

Implications/Risks

Adoption of revised Terms of References for Council's Committees mitigates the risk of the internal compliance framework not being aligned between documents and keeps the documents Fit-for-purpose.

Legal implications

The status of Council Committees is laid out in the Local Government Act 2002 and the Terms of Reference formalise the purpose and powers of this Committees.

Attachments

Attachment 1: Propose Changes to the Terms of Reference for the Resource Management Committee

Attachment 2: Propose Changes to the Terms of Reference for the Risk & Assurance Committee

Proposed Changes to the Terms of Reference for the Resource Management Committee

Note: Proposed changes are shown below in ***bold, italics and underlined***.

Resource Management Committee – Terms of Reference

(a) Purpose

To guide and monitor the resource management, ***building***, biosecurity, transport, environmental monitoring, mining and emergency management functions of the West Coast Regional Council.

(b) Meetings

The Resource Management Committee will have ordinary meetings as required.

(c) Delegations

1. To formulate and recommend to Council (unless otherwise stated in this section) all policies, plans and strategies on resource management, and to review such policies, plans and strategies as necessary.

2. To set and review policy in respect of resource consent processing, compliance monitoring, mining responsibilities, ***building legislation functions***, environmental monitoring and enforcement. ***This includes the following delegations:***
   - ***To approve a list of accredited Hearing Commissioners from which appointments can be made to hear and/or decide resource consent applications, reviews or changes to consents, or from which nominations can be made for Hearing Commissioner appointments; and***
   - ***To decide on/approve the release of bonds associated with mining.***

3. To make submissions and representations on matters relating to resource management, on District and Regional plans, national policies and programmes, and on legislation and regulations affecting the Council's interest.

4. To formulate, approve and review biosecurity plans and policies.

5. To formulate, approve and review all transport plans and policies and to manage transport issues.

6. To formulate, approve and review strategies for activities related to natural hazards and contaminated sites.

7. To formulate, approve and review flood warning manuals and procedures.

The Resource Management Committee may appoint sub-committees or working parties as appropriate provided they are limited to a time duration consistent with performance of their specified tasks.

(d) Membership

The Resource Management Committee shall be a committee of the whole Council. All elected members of the West Coast Regional Council shall be members of the Resource Management Committee and in addition, a representative appointed by each of the tribal Rūnanga on the West Coast, namely Te Rūnanga o Ngāti Waewae and Te Rūnanga o Makaawhio.

A quorum of the Resource Management Committee shall be four members.

(e) Explanatory Comment

The Resource Management Committee will be responsible for establishing and reviewing the statutory and

legal policy instruments of Council. This will particularly include Resource Management Act Policies and Plans, Regional Land Transport and Passenger Transport Plans, and Pest Management Plans.

Risk and Assurance Committee

(a) Purpose

To ensure that Council has appropriate financial, risk management and internal control systems in place that provide Council with:

1. An overview of the financial performance of the organisation;
2. Effective management of potential opportunities and adverse effects; and
3. Reasonable assurance as to the integrity and reliability of Council's financial and non-financial reporting.

(b) Areas of Responsibility

- Risk management and the system of internal controls.
- Reporting – financial and non-financial.
- Maintain an effective relationship with the external auditor.
- Appoint or engage any internal auditor.
- Promote, monitor and review compliance with Council's legal and other obligations.
- Ensure there is good communication between Council, Committees and Management.
- Prepare and implement programmes of work relevant to the purpose of the Committee.

(c) Delegations

The Committee is delegated the authority to:

- Receive and consider external and internal audit reports.
- Receive and consider staff reports on audit, internal controls and risk management related matters.
- Make recommendations to the Council on financial, internal control and risk management policy and procedure matters as appropriate.
- To approve the Auditors' engagement and arrangements letters in relationship to the Annual Report.
- ***To approve the write-off or write-down of general debtor invoices for sums greater than $10,000, and approval of the write-off or write-down of rate debtor invoices or penalties for sums greater than $10,000.***

(d) Meetings

The Risk and Assurance Committee will meet quarterly, with additional meetings as required.

(e) Membership

The Committee shall be made up of ~~four~~ ***all*** elected members of the Council. A quorum of the Committee shall be not less than two members.

Proposed Changes to the Terms of Reference for the Risk & Assurance Committee

Note: Proposed changes are shown below in ***bold, italics and underlined***.

Risk and Assurance Committee – Terms of Reference

(a) Purpose

To ensure that Council has appropriate financial, risk management and internal control systems in place that provide Council with:

1. An overview of the financial performance of the organisation;
2. Effective management of potential opportunities and adverse effects; and
3. Reasonable assurance as to the integrity and reliability of Council's financial and non-financial reporting.

(b) Areas of Responsibility

- Risk management and the system of internal controls.
- Reporting – financial and non-financial.
- Maintain an effective relationship with the external auditor.
- Appoint or engage any internal auditor.
- Promote, monitor and review compliance with Council's legal and other obligations.
- Ensure there is good communication between Council, Committees and Management.
- Prepare and implement programmes of work relevant to the purpose of the Committee.

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- Receive and consider external and internal audit reports.
- Receive and consider staff reports on audit, internal controls and risk management related matters.
- Make recommendations to the Council on financial, internal control and risk management policy and procedure matters as appropriate.
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(d) Meetings

The Risk and Assurance Committee will meet quarterly, with additional meetings as required.

(e) Membership

The Committee shall be made up of ~~four~~ ***all*** elected members of the Council. A quorum of the Committee shall be not less than two members.

Report to: Council	**Meeting Date: 10 August 2021**
Title of Item: West Coast Emergency Management – July Flood Event Response	
Report by: Claire Brown, Regional Director, Emergency Management and Natural Hazards	
Reviewed by: Heather Mabin, Acting Chief Executive	
Public excluded? No	

Report Purpose

This 'information only' report provides a brief overview of the role of the West Coast Emergency Management (WCEM) in the lead-up, response to and proposed recovery of the July flooding event. This has been a significant event for the region that has involved considerable resource, primarily staffing, to support the functioning of the Emergency Coordination Centre (ECC) in Westport (and initially also in Greymouth).

Report Summary

The report:

- sets out a condensed and abbreviated summary of events for the severe weather event and Westport flooding,
- highlights the opportunity to carry forward proposed changes to WCEMs work programme going forward.

Draft Recommendations

It is recommended that Council resolve to:

Note this report

Issues and Discussion

Background

Monday 12 July

From early in the week beginning Monday 12 July 2021, MetService forecasts indicated a considerable rain event would take place later in the week. Monitoring activities commenced as the volume of rain forecast was up to 380mm in 41 hours for the Buller area.

Thursday 15 July

On Thursday 15 July 2021, MetService issued a 'Red' Heavy Rain Warning. This is only the third time that a 'Red' warning has been issued since MetService established reviewed its warning system. The first was for South Westland in February 2020, and the second for the Canterbury Flood in June 2021. Planning activities continued with urgency to connect with agencies, prepare rosters for activating coordination centres, and communicate to a range of stakeholders.

At this point in time, the WCEM team's sole focus was on coordinating events in preparation for full activation potentially across all three districts.

Friday 16 July

An agency briefing (including all four councils) took place on Friday 16 July 2021 to share and coordinate planning activities. During that day all councils had a level of activation and were rostering staff in preparation for scaling up levels of activity.

We were anticipating widespread impact, through Friday and Saturday as several rivers in both Grey and Buller districts were moving through alarm levels.

A crucial focus was on our linkages to natural hazard, hydrology, and engineering staff. At this point we were in contact and coordinating efforts of multiple agencies and stakeholders. For example, NZ Defence had staff on the ground from Friday.

Earlier on in the weather event there was considerable concern relating to both Grey and Buller Rivers. The Grey River Flood Committee had an initial meeting on Friday16 July as per the flood plan.

As concerns escalated for the Buller River, evacuations commenced in Westport Township. This became a mandatory evacuation message to the public later on Friday, with Buller declaring a State of Emergency at 1.15pm that afternoon.

Saturday 17 July

Through Saturday 17 July, the risk from the Grey River slowly began to reduce. However, the seriousness of the impact on particularly the Westport Township was increasing.

Sunday 18 July

On Sunday 18 July we determined the impact and risk was mostly centred on Westport area. The Emergency Coordination Centre in Greymouth was stood-down at the same time the centre in Westport transitioned into a coordination centre, rather than an operation centre. This change recognised the flooding impacts mainly centred in Westport, and that the coordination centre should report directly to the National Crisis Centre in Wellington and be resourced as such.

Ongoing sustained activity continued to be coordinated from Westport. That extent and duration of the activity was significant – and continues into this present week as the activation transitions to a recovery phase.

Current situation

A Recovery Office is being established in Westport led by Buller District Council. WCEM has a responsibility to remain connected with this work, as Emergency Management has a responsibility in the Recovery phase under the Civil Defence and Emergency Management Act 2002. A WCEM liaison role will maintain the connection to the recovery activities this is expected be fulfilled in the main by the Group Manager.

A structured debrief will be arranged with support from National Emergency Management Agency (NEMA). This response highlights a range of opportunities and challenges faced by response agencies and WCEM in our coordinating role. The results of the debrief are expected to influence the work priorities of WCEM, that will be presented to the Coordinating Executive Group (CEG) for discussion in advance of making recommendations to the Emergency Management Joint Committee.

Financial implications

There are considerable and varied financial impact from both the response and recovery to this event for the region and the district and affected communities. Cost recovery and reimbursement discussions are underway by both the Buller District and our Council, in association with NEMA and other relevant government agencies.

Council will estimate costs to be considered for both the duration of the flooding event and any costs to Council during the Recovery period.

Report to: Council Meeting	**Meeting Date:** 10 August 2021
Title of Item: The Position of WCRC in the Climate Change Debate	
Report by: Hadley Mills, Planning Science and Innovation Manager.	
Reviewed by: Heather Mabin, Acting Chief Executive	
Public excluded? No	

Introduction

Council staff received a report from Cr John Hill titled "The Position of WCRC in the Climate Change Debate". This report seeks to clarify Councils position on anthropogenic climate change. The report is attached as Attachment 1.

Draft Recommendations

It is recommended that Council resolve to:

1. Receive the report.
2. Acknowledge human contributions to climate change.
3. Support climate change mitigation initiatives only if such initiatives enhance the economic, cultural, and social wellbeing of West Coast communities.

Attachments

Attachment 1: The Position of WCRC in the Climate Change Debate

The Position of WCRC in the Climate Change Debate

Introduction

The West Coast Regional Council (WCRC or the Council) is perceived to be the only council in New Zealand that does not acknowledge anthropologically induced climate change. The Chair of the WCRC is a noted climate change denier and this feeds the perception of the Council's stance.

The Council Chair is justified in his belief, being his democratic right, and he rightly states that it is his belief and not the belief of WCRC, that the concept of climate change is a scam.

Other elected representatives on the Council have differing views on the human contribution to climate change which are equally valid.

Central Government and LGNZ strongly acknowledge the anthropological contribution to climate change that has occurred during the Industrial Revolution over the last 200 years.

Discussion

Detailed scientific discussion of climate change is outside the scope of this brief paper.

However, there is little scientific doubt that one of the main drivers of climate change relates to the concentration of carbon dioxide in the upper atmosphere.

There are those who believe that carbon emissions that have resulted in climate change originate from natural phenomena such as volcanoes and alpine faults, and that NZ is particularly prone to this, being part of it's natural hazardscape. Additionally, planet Earth is subject to continuous cyclical climate change that occurs over millions of years as the planet moves in and out of ice age conditions.

There are those who believe that climate change is due to increased carbon emissions, that have increased throughout the Industrial Revolution of the last 200 years for which humans are responsible.

It is logical that if climate change is related closely to carbon dioxide levels in the atmosphere, both natural and anthropological emissions of carbon dioxide contribute to climate change.

It is also logical that humans can only exert influence over climate change resulting from anthropological carbon emissions.

It is accepted that small countries make only a small contribution to carbon dioxide emissions on an individual basis, but all small countries such as New Zealand, Iceland, Turkey etc cumulatively contribute significantly to climate change.

The West Coast is currently under considerable pressure from central government policy that unfairly treats the West Coast due to the "one size fits all" approach. The Zero Carbon Bill has the potential to lead to climate change mitigation policy that may adversely affect

the economic, cultural and social wellbeing of West Coast ratepayers. Some climate change policy does not fit the West Coast lifestyle. The electric vehicle policy may have a perverse outcome whilst the Coast is prevented from developing hydro- based electricity generation. Replacing coal with wood biomass in commercial boilers is commercially unfeasible whilst biomass is significantly more expensive than wood. There is a strong argument that projects such as these should not be considered on the Coast under the present circumstances.

There are, however, economic opportunities that may arise from the Zero Carbon Bill such as establishing a West Coast biorefinery that will ensure self-sufficiency in clean diesel, resilience, employment etc. Carbon emission reductions would simply be an added advantage.

Recommendations

1. That the West Coast Regional Council acknowledges human contributions to climate change.
2. That the West Coast Regional Council supports climate change mitigation initiatives only if such initiatives enhance the economic, cultural, and social wellbeing of West Coast communities.

Report to: Council	**Meeting Date:** 10 August 2021
Title of Item: Operations Monthly Works Report	
Report by: James Bell – Engineering Officer, Paulette Birchfield - Engineer, Brendon Russ – Engineer, Sabrina Swensson – Business Support Officer	
Reviewed by: Randal Beal – Director of Operations	
Public excluded? No	

Purpose

The purpose of this report is to provide Council with an overview of the works undertaken during the month of July 2021. Also presented in this report will be the production and sale of rock from the council owned quarries during the month of June 2021.

Summary

Opening of the Cobden Cut – 17 July 2021

On the night of 16 July 2021 flooding in the Grey River and incoming tide meant the Range Creek culvert floodgates at Cobden were required to be closed at 10.30pm to prevent floodwaters from the Grey River backing up into the Cobden Aromahana Lagoon and lower Cobden. Two localised downpours around 12am caused localised flooding in lower Cobden but due to the tidal and river conditions there was no mechanism to relieve that pressure.

Once the tidal conditions were favourable, local contractors Paul Smith Earthmoving Ltd were able to remove the sliding gate with an excavator before low tide at 10am on 17 July and kept the Cut open until the gate was replaced at 1pm. Flood levels in the Grey River had by then receded enough to allow the reopening of the Range Creek culvert floodgates. The "Cobden Cut" with raised sliding gate is shown in Photo 1 below.

Water flow through the "Cobden Cut" was estimated at 200 litres per second. Figure 1 shows the effect the opening and closing of the Cut had on the water level gauge in Cobden Aromahana Lagoon.

Photo 1. Discharge to Cobden beach from the Cut.

Photo 2. Removing the sliding gate

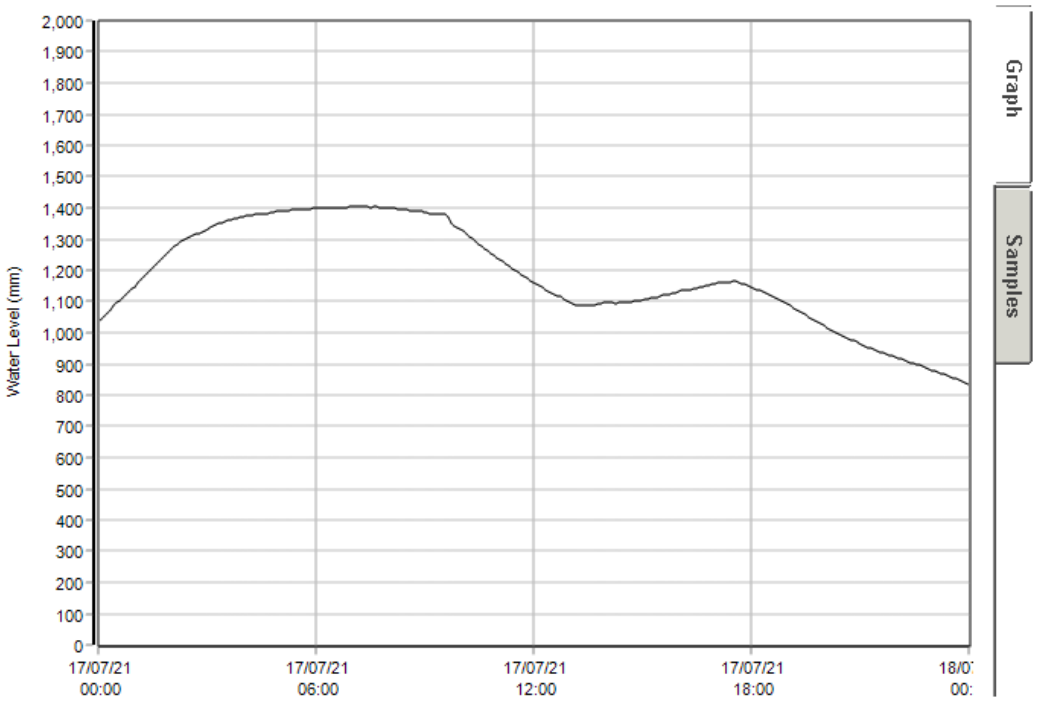


Figure 1: Cobden water level gauge at lagoon. 12am Saturday 17t July 2021 to 12am Sunday 18 July 2021 showing the drop in water level resulting from the removal of the gate (10am), and slight temporary rise in water level when the gate was replaced (1pm).

Punakaiki Rating District

The contract works to place concrete sections and rock on the Punakaiki Seawall was completed on 16 July. A total of 1553 tonnes of rock and 250 tonnes of concrete were placed for a total cost of $70,942.

Punakaiki Seawall, looking north before start of works. May 2021

Punakaiki Seawall looking south, after works completed. July 2021

Quarry Rock Movements for the period of June 2021
(excluding Royalty Arrangements)

Quarry		Opening Stockpile Balance	Rock Sold	Rock Produced	Closing Stockpile Balance
Camelback	Large	36976	0	0	36976
Blackball		670	0	0	670
Inchbonnie		10,000	0	0	10,000
Kiwi		0	0	0	0
Miedema		0	0	0	0
Okuru		450	0	0	450
Totals		**48,096**	**0**	**0**	**48,096**

RECOMMENDATION

That the report is received.

Report to: Council	**Meeting Date: 10 August 2021**
Title of Item: Ownership of the Greymouth Floodwall	
Report by: Randal Beal - Director of Operations	
Reviewed by: Your name and title	
Public excluded? No	

Report Purpose

The purpose of the report is to provide Councillors information on assuming ownership of the Greymouth floodwall

Report Summary

West Coast Regional Council to consider, and if agreed, provide staff approval to accept transfer of ownership of the Greymouth Floodwall from Grey District Council.

Draft Recommendations

It is recommended that Council resolve to:

Approve staff to formally accept ownership of the Greymouth Floodwall and updating the Joint Floodwall Committee agreement accordingly.

Issues and Discussion

Background

The Greymouth Floodwalls were constructed following the double floods of 1988 when the central business and surrounding areas were flooded by the Grey River.
The cost of construction in the early 1990s was approximately five million, which comprised of central government funding of about 80% and Greymouth District Council funding the balance.

Current situation

The floodwall is managed by a joint committee between Grey District Council (GDC) and West Coast Regional Council (WCRC) supported by a Joint Committee agreement that sets out the individual responsibilities.
The "Greymouth Floodwalls Joint Agreement" sets out the various responsibilities of the WCRC and GDC. The Joint Agreement is under Local government Act 2002, clauses 12 and 137, and Schedule 7, clauses 30 and 30A.

The current asset has been re-valued at $15.4M in June 2021.

WCRC is responsible for maintenance and repair and the structural integrity of the floodwalls.

GDC is responsible for;

- Amenity management.
- Storm-water management
- Flood emergency management
- Ownership is vested in GDC.

A Joint Committee meeting was held in October 2020 where a recommendation was made to transfer the ownership of the Greymouth floodwall to WCRC. GDC consulted with the community through the 2021/31

LTP consultation process on transferring the ownership of the Greymouth Floodwall to West Coast Regional Council and has made the decision to formally transfer the asset to WCRC.

Options Analysis

Council doesn't accept the transfer of ownership.

Costs and Benefits

There are benefits to the Rating District for having the floodwall asset specifically insured under WCRC's insurance policy.
There is no additional cost to accepting the transfer of ownership.
As owner, Council will have more control over safety and functionality of the structure vs amenity value.

Considerations

Implications/Risks

No change to existing responsibilities are proposed.

Significance and Engagement Policy Assessment

This hasn't been assessed.

Financial implications

Council will be able to capitalise the IRG project work.

Legal implications

Not yet assessed, this will be worked through with staff who will report back if any are encountered.

Attachments

Nil.

Report to: Council	**Meeting Date: 10 August 2021**
Title of Item: Greymouth Floodwall Seepage Report	
Report by: James Bell – Engineering Officer, Paulette Birchfield - Engineer	
Reviewed by: Randal Beal – Director of Operations	
Public excluded? No	

Report Purpose

The purpose of this report is to provide Council with a brief history of known seepage of the Greymouth Floodwall along Richmond Quay/Boundary Street/Johnston Street, the effects of the seepage during the 16-17th of July event, as well as recommendations from the Regional Council Engineers.

Report Summary

Floodwall seepage has previously been observed on both the Greymouth and Cobden flood banks and independent investigations have been carried out in 1993, 1998, 1999 and 2009. The reports resulted in work being carried out in 2003.
The most recent flooding in the Grey River on the 16-17th July 2021 again caused seepage to occur through the road seal along Richmond Quay and to a lesser degree at Johnston Street, over an estimated length of 200m.
Further investigation is required to assess the current level of risk and risk mitigation options.

Draft Recommendations

It is recommended that Council resolve to:

1. *It is recommended that Council resolves to note the report and the work being undertaken by staff.*
2. *Staff prepare a report for the Grey Floodwall Committee with recommendations and costings*

Issues and Discussion

Background

Since before the completion of the Greymouth Floodwall in 1991, seepage has been observed in the Richmond Quay, Boundary Street/Johnston Street area when the river is in high flood. Water was observed welling up through the road seal and stormwater gutters, and a large boil occurred in the road near the intersection of Johnston Street and Richmond Quay during the 1988 flood. This seepage is thought to be caused by historic infilling of river paleo-channels with gravels, silts and limestone, or possibly the presence of old redundant stormwater and drainage outfalls to the river.
Seepage has previously been observed on both the Greymouth and Cobden flood banks and independent investigations have been carried out in 1993, 1998, 1999 and 2009. The reports resulted in work being carried out in 2003.
Following the construction of the Greymouth Floodwall in the early 1990's, several reports on the geotechnical integrity of the floodwall have made recommendations for further investigation of stopbank security at this location. The most recent report by Riley Consultants Ltd completed prior to the 2009 Greymouth Floodwall Upgrade provided geotechnical input to the upgrading works. This geotechnical work was not a condition assessment of the existing floodwall, but it did include observations on the seepage that had been occurring, and some subsurface investigation works were also undertaken.
A 10m deep drill hole as part of the 2009 investigation was located to the west of Mawhera Quay and Richmond Quay, near where seepage had been consistently observed previously during flood events. Here subsurface sediments were found that would not provide significant resistance to seepage flow from the river.
It was interpreted that seepage flows are able to pass beneath the 6m deep clay cut off zone in the floodwall and discharge in the stopbank toe area, and that it is likely that the clay cut off is not very effective in reducing flow or pressure in the upper founding soils and minimal head loss is occurring in even the near surface soils.
The risk of a breach of the floodwall was assessed as moderate to low in a 1:100 year event (with a short duration of peak flood loading) and potential options to increase stopbank security were provided.

Current situation

The most recent flooding in the Grey River on the 16-17th July 2021 again caused seepage to occur through the road seal along Richmond Quay and to a lesser degree at Johnston Street, over an estimated length of 200m. River flow peaked at 4596.94 cumecs at 5.40am on the morning of the 17th July. During this event seepage was observed to initiate when the river flow reached around 4000-4100 cumecs (5.3m Dobson gauge).
A flow of that magnitude currently has a statistical return period of 2.8 to 3 years. Seepage flow through the road ceased when the river flow receded to below approximately 4000 cumecs several hours later.

19th July 2021. Damaged road seal due to seepage pressure on Richmond Quay.

Considerations

Implications/Risks

This investigation will inform the assessment of the risks and risk mitigation options.

Financial implications

Investigation work is not allowed for within the current budget. If the work is approved Rating District reserves will be required to be used.

Recommendations and costings will be presented at a Joint Floodwall Committee meeting.

Attachments

Greymouth Floodwall Upgrade Design Geotechnical Report.

RILEY CONSULTANTS

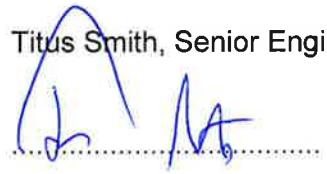
GREYMOUTH FLOOD WALL UPGRADE DESIGN GEOTECHNICAL REPORT

Engineers and Geologists

GREYMOUTH FLOOD WALL UPGRADE DESIGN
GEOTECHNICAL REPORT

Report prepared for: Good Earth Matters

Report prepared by: Titus Smith, Senior Engineer, CPEng



Report reviewed by: Don Tate, Director, CPEng

Report Reference: 09828-A

Date: 9 November 2009

Copies to: Good Earth Matters 2 copies

Riley Consultants Ltd 1 copy

Revision:	Details:	Date:
0	Report	9 November 2009

Riley Consultants Limited, Ground Floor, 395 Madras Street
PO Box 4355, Christchurch 8140, New Zealand
Telephone 64 3 379 4402, Facsimile 64 3 379 4403
rileychch@riley.co.nz www.riley.co.nz

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Appendices

GREYMOUTH FLOOD WALL UPGRADE DESIGN GEOTECHNICAL REPORT

1.0 Introduction

Riley Consultants Ltd (RILEY) has been engaged by Good Earth Matters to provide geotechnical input for the design of upgrading works of the flood protection system along both sides of the Grey River downstream of the rail bridge. The details of the floodwall upgrade are provided in the construction documents completed by others, the main elements of the project from a geotechnical standpoint being:

- Concrete floodwalls founded on existing stopbanks over a length of around 1500 m
- A new section of stopbank around 1 m above existing ground level and 140 m long
- A new section of stopbank around 4 m above existing ground level and 110m long
- Raising of existing stopbanks by 0.2 m to 0.7 m over a length of around 1300 m
- Minor raising/re-contouring of existing stopbanks over a length of around 2800 m.

The design standard for the upgrade is for 600 mm freeboard in a 1:50 flood, and a higher standard of 600 mm freeboard in a 1:150 flood where new floodwalls are proposed.

1.1 Scope

The overall aim of the investigation is principally to provide information to assist the overall design of the upgrade project. The desired end result is to confirm that relevant geotechnical issues have been taken into account and that the risk of failure of the various structures in terms of geotechnical failure modes is acceptably low for the adopted design standard. The geotechnical work is not a condition assessment of the existing stopbanks as such; rather confirmation is required that the proposed works do not exacerbate existing geotechnical risks for the proposed design standard. The purpose of this geotechnical report is to document the results of the investigation, and to summarise conclusions and recommendations on geotechnical aspects of the project.

2.0 Geological Setting

Published information (Ref 1) for the site indicates the existing stopbanks adjacent to the Grey River upstream of the estuary (i.e. upstream of the Goods Shed on the true left and Cobden Island on the true right) are generally underlain by river gravel, sand and silt of young river flats. Estuarine deposits are indicated around the periphery of the estuary south of the Fisherman's Wharf area, and marine gravel and sand are indicated along the river banks downstream of the estuary. Significant reclamation efforts have occurred along the banks of the river including training levees and revetments at the river mouth.

At the upstream limit of the true left stopbank, the Cobden Limestone of Peter Range is encountered. This limestone is regionally westward dipping at an angle of around 27°.

3.0 History of Flood Wall Development

From 1979 development of a flood protection scheme in Greymouth had been underway. In 1986, North Tip Road was raised, along with installation of the gated culvert at Range Creek.

Following severe flooding in 1988, a new system of stopbanks and floodwall was proposed. Construction of the new infrastructure was completed in 1991, and no significant upgrading of the scheme has been undertaken since. The nature and extent of reclamation work and stopbank construction previous to the events of 1979 have not been reviewed in detail, however it is understood that significant historical activity has occurred in the area, and variable quality fill is likely to exist beneath the current floodwall arrangement.

A series of performance and risk reviews have been undertaken since completion of the flood wall in 1991, and key relevant findings from these reports (Ref 2, 3) are summarised below.

Cobden

- A specific area of low quality historic fill within a reclaimed river channel in the area of Taylor St has been identified, and there has been an associated settlement issue
- The earth stopbank is subject to significant seepage resulting in landward-side flooding, and the majority of this flow is inferred to be via the aforementioned area of historic fill

Mawhera Quay

- Flood wall seepage area has been identified around the intersection with Boundary St, and west toward Johnston St pump station. Water pressure has been observed beneath the adjacent road pavement in this area.

4.0 Basis for Investigation

As a condition assessment of the existing stopbank is outside the scope of this report, investigation has been targeted around areas where significant stopbank raising will occur. This is to ensure that the additional floodwall height is appropriately designed and detailed so as not to negatively affect the existing stopbank stability. The key areas selected for targeted investigation generally incorporate a raise for the 1:50 AEP flood standard of more than 200 mm. Investigation has therefore been targeted at:

- Two Bridges
- Mawhera Quay
- Goods Shed
- Fisherman's Wharf
- Cobden around Range Creek Culvert

Note that the section of stopbank at Cobden around Taylor St previously identified as having deficient foundations will not be modified under the proposed works, and has not been targeted for investigation.

The scope of the investigation was derived after a walkover inspection and assessment of the key areas in terms of geotechnical risk. A draft programme of investigation was derived and agreed with WCRC.

5.0 Fieldwork and Laboratory Testing

A programme of sub-surface investigation has been undertaken, including excavation and logging of 24 test pits. Test pit locations are indicated on the drawings in appendix A, and test pit logs are included in appendix B. 4 Machine drillholes were undertaken by CW Drilling. The fieldwork was overseen by technicians or geologists from RILEY and logs are presented in terms of the New Zealand Geotechnical Society Guidelines. Initially hand augers were attempted in some locations but were abandoned at an early stage due to difficulties with gravels.

Laboratory tests have included particle size distribution on selected samples, and a standard Proctor compaction test on a sample of existing stopbank material. Results are included in appendix C.

6.0 Geotechnical Considerations and Recommendations

Observations from the investigations along with comments and recommendations for specific locations are detailed in the follow sections. In each case geotechnical failure modes are considered, these may include:

- Seepage effects and internal erosion
- Slope stability
- Settlement
- Loss of support or undermining
- Foundation instability or overstressing

All of the above failure modes may not be applicable in all locations.

6.1 Two Bridges

This area is located at the base of a large limestone bluff, adjacent to the railway line. The railway appears to have been founded on bedrock, and water flow is exiting the base of the outcrop via open defects and a large solution cavity to the river via covered drains.

To achieve the design stopbank crest level in this area, an earth fill up to 4 m above existing fill height is required. The culvert beneath the fill draining seepage flows from the bluff area is cracked and deformed and will require replacement. In addition a small bridge will be replaced by a culvert. The vertical height from the existing culvert inverts to final stopbank crest level is around 7 m.

6.1.1 Investigations and Geotechnical Model

Four test pits and two boreholes were completed in the two bridges area. Ground conditions generally comprise limestone bedrock overlain by dense river gravels 1 m to 2 m deep, overlain by soft river sediments around 1 m thick, overlain by a minimum of around 1.5 m of granular fill. SPT values in the soft river sediments are very low (as low as 0) increasing to typically in excess of 30 in the denser gravels. The fill is variable in composition and in places contained wood fragments, steel and brick inclusions. Groundwater seeps were noted near the base of the test pits, but flows were only modest. Groundwater level within the pits and boreholes was similar to the level of the adjacent river. However, during drilling of DH3 a higher water table was observed within the underlying rock. The water pressure was not artesian (i.e. stabilised below ground level) however was some meters higher than the piezometric level in the overlying alluvium. It is inferred that interconnected defects within the limestone bluff adjacent to the site provide conduits for water from the bluff, which exit at various locations including the two open drains observed on site, as well as sub-surface seepage points, and possibly higher elevation drainage points at times of heavy rainfall and high water pressures within the bluff.

A stability assessment of the proposed fill embankment slope has been completed using a two-dimensional limit equilibrium model. The assessment indicates that the presence of the soft alluvial sediment underlying the existing fill results in acceptable factors of safety under the additional loading of the proposed stopbank fill. However in the event of elevated groundwater levels within the stopbank such as may occur in the event of heavy rainfall locally resulting in seepage pressures from beneath/behind the stopbank from the limestone bluff, factors of safety approach 1 (i.e. a state of failure). Removal of the existing fill and underlying soft sediment, and founding on denser alluvial sediments was then modelled. The resulting factors of safety are around 1.7 for the normal (observed) groundwater profile, and 1.5 for a postulated adverse groundwater profile associated with high seepage rates from the underlying bluff or a rapid drawdown scenario from recession of river flood level. The results are summarised in table 1, and printouts of the stability analysis are included in appendix 4. Note that high water levels in the Grey River do not represent a critical load case for this section of stopbank on the landward side, which is well buttressed by the railway on the landward side.

Scenario	Factor of Safety
New stopbank constructed on existing sediments – normal groundwater levels	1.5
New stopbank constructed on existing sediments – high groundwater levels	1.0
New stopbank foundation excavated to dense alluvial sediment – normal groundwater levels	1.7
New stopbank foundation excavated to dense alluvial sediment – high groundwater levels	1.5

Table 1: Factors of Safety

In addition liquefaction and excessive settlement are significant risks. Liquefaction of this very loose soil is likely in even a moderate earthquake with subsequent major slumping and settlement of the fill embankment. It is therefore recommended that the existing fill and soft underlying sediments be undercut, and the stopbank fill founded on the dense underlying sediments.

6.1.2 Key Considerations

Geotechnical considerations for the area include:

1. The strength of the sand/silt in situ river sediments is low, and it is recommended that the area be undercut to allow founding of the stopbank and proposed culverts on dense materials. Some of the existing fill may be able to be re-used. The plan and depth extent of undercutting will require conformation on site.
2. Seepage flows from the bluff must be adequately drained to ensure that seepage pressures do not build up within the stopbank fill. The old culverts are scheduled for replacement, and the new culverts should be carried through to interface with the rock bluff. Detailed logging of the rock bluff should be undertaken at the time of construction, and drainage works installed for any open defects in the rock face, so that all seepage flows are collected and passed through the culverts beneath the stopbank fill. Free draining fill materials should be used up to the level of the existing railway, as the lower portion of the stopbank will not be required to retain water due to the site geometry.
3. Erosion protection of the new stopbank is required, as it forms the outside of a river bend and will be impacted by the main channel of the river during flood flows. Heavy rock protection should be allowed for the full extent of the stopbank batter.
4. The necessary sub-excavations are below the river level and groundwater inflows should be expected. Careful management of these inflows and the natural springflows are required by contractors to ensure that fill standards are not compromised. In particular contingency measures should be in place such as pumps and construction methodology to minimise the time of exposure within the lowest excavation levels.
5. The existing fill embankment where it supports the railway is relatively steep, and design concepts should aim to avoid any significant destabilising effects. It is recommended the existing fill is not undercut except for minor trimming of the face and that temporary slopes do not exceed the existing slope.

6.2 Mawhera Quay

This refers to the section of stopbank incorporating existing prefabricated concrete retaining walls that run adjacent Mawhera Qy and Richmond Qy roads. It is proposed to install a freestanding concrete wall around 0.9m high along the crest of the existing stopbank.

The design stopbank cross section is known from a drawing supplied by the WCRC (reproduced in figure 1). This incorporates a sloping, low permeability upstream core zone extending around 2.5m vertically. The core then runs horizontally into the centre of the stopbank, and ties into a “clay core” cutoff indicated to be 6m deep within founding soils. The landside batter is supported by 2 low precast concrete retaining walls. The main potential issues associated with the floodwalls are seepage along or near the interface with the underlying soils, and foundation resistance to various potential failure modes. Due to the low height of these walls settlement or bearing capacity are not likely to be issues.

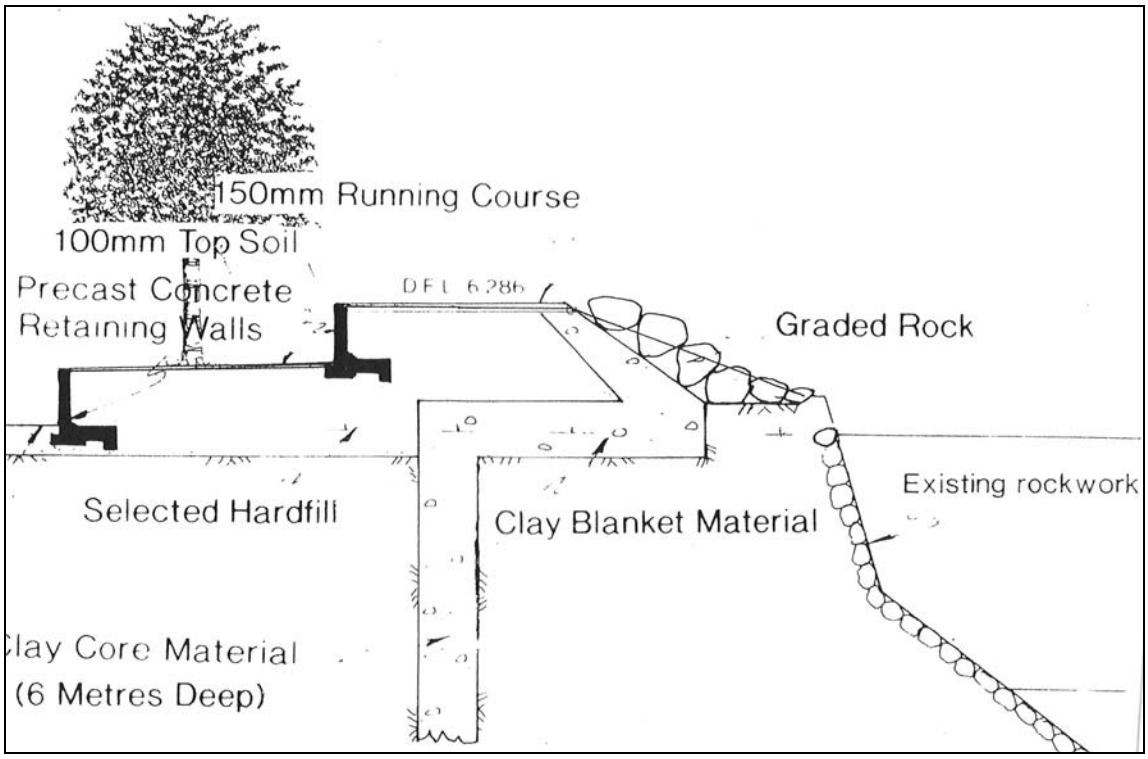


Figure 1: Original Design Section for Mawhera Quay Flood Wall

6.2.1 Investigations

Six shallow test pits and one drill hole were completed along this section of stopbank

(a) Floodwall Section

Generally the supplied design stopbank profile was confirmed by the investigation, although pits only extended to around 0.5m deep to ensure damage to the existing stopbank was minimised. Laboratory testing including 2 particle size distribution tests on each of the sloping silty gravel core and general fill zone were completed in addition to a standard compaction test on core material. Grading curves for the samples are indicated in figure 2. Laboratory testing indicates the low permeability upstream core is a silt with sand and gravel that is expected to effectively limit seepage flows. The grading of the adjacent gravel fill has been checked for filter compatibility with the core, and is found to generally comply with the "no erosion" criteria. The materials exhibit a degree of gap-grading, however given the short duration of any seepage flow through the upper part of the stopbank, it is considered unlikely that piping features or internal erosion would develop.

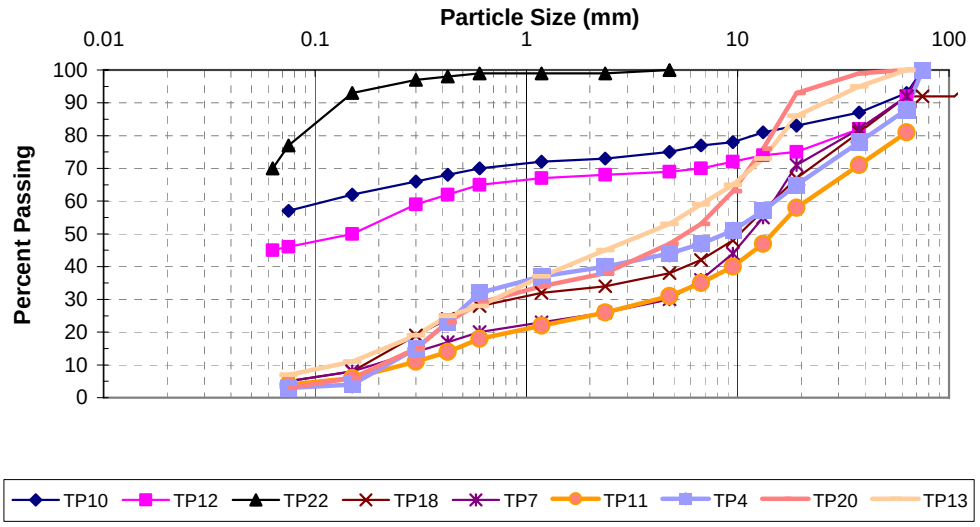


Figure 2: Plot of Laboratory Grading Curves

(b) Area of Observed Seepage Pressure

The drill hole was located to the west of the section near the intersection of Mawhera Qy and Richmond Qy roads, where seepage has been experienced in recent flood events. The borehole was located on the landward side of the 6m deep clay cutoff indicated in the supplied design drawing. The materials encountered by the drill hole generally comprised fill to around 3.4m, gravel and sandy gravel to around 7m, with sand and gravelly sand below this to the hole target depth of 10m. None of the sediments encountered in the hole would provide significant resistance to seepage flow from the adjacent river, and as the stopbank central clay cutoff extends only 6m, it is interpreted that seepage flows are able to pass beneath the cutoff zone and discharge in the stopbank toe area. It is also quite likely that the clay cutoff is not very effective in reducing flow or pressure in the upper founding soils. and minimal head loss due to seepage is occurring in even the near surface soils.

The permeability of the founding soils at this location are likely at the upper limit of the hardfills tested, as the nature of the founding gravel soils is similar. Based on various correlations from grading curves the permeability is assessed as in the range 4 to 8 $x10^{-4}$ m/s. This is significantly higher than the in situ permeability test, but this test appears to give an unrealistically low permeability.

Based on previous transient groundwater modelling we have undertaken for stopbanks a head loss due to seepage can be derived, based on permeability. A head loss of only 1m is predicted at the toe of the stopbank (i.e. the carriageway), and thus for only moderate flood events artesian pressure is predicted beneath the carriageway. This is consistent with the observed heaving of the carriageway seal in previous flood events i.e. artesian uplift pressure exceeds the weight of the overlying materials.

6.2.2 Key Considerations

(a) Floodwall Section

For design of the floodwall RILEY recommends the following:

1. The wall be located near the river-side of the stopbank, with the footing cast insitu directly on the low permeability core zone after removal of topsoil etc, and extending onto the free draining bulk fill zone.
2. A key be incorporated in the footing to increase resistance to sliding. The key should be located within the free-draining gravel rather than the low permeability core, to ensure minimal disturbance to the core zone.
3. During construction, the core zone should be exposed and tested to ensure it has appropriate density and moisture content to act as a footing foundation and water retaining material for concrete structure interface. It may be appropriate to re-condition the core zone by addition of water/scarifying/re-compaction.
4. The footing should found on the low-permeability zone a minimum width of 200mm and preferably more. It is possible the low permeability material may not be encountered or at marginal thickness at tentative founding level (for example if hardfill thickness is greater than about 300mm). For this scenario placement of low permeability soil will be required to create a continuous seepage barrier, as it may not be desirable to lower the founding wall level.
5. A worst-case overturning and uplift stability check be undertaken including full water pressure on the wall face, and full water pressure along the foundation slab (i.e. seepage pressure assuming a crack forms at the interface). A factor of safety greater than 1.0 would be appropriate for such an extreme flood case if the flood level is taken to the top of the wall.
6. To ensure erosion/deterioration at the river-side foundation interface of the wall does not occur, it is recommended that a filter fabric detail down the face of the wall and between the core and riprap be incorporated. Riprap should be placed on the fabric against the base of the wall and marry in with the existing rip rap.
7. Wall stability should be checked for failure modes of uplift, sliding and overturning. A typical required factor of safety is 1.5 for these modes, for a conservative assumption of a flood level at the top of the wall. This water level is higher than the 1% AEP flood level. We recommend that the base width be a minimum of 1m, in order to provide a minimum seepage length. Each of these failure modes should be checked for a triangular uplift distribution i.e. headwater at the upstream end to zero at the downstream toe. We have considered placement of a drain at the landward toe, but due to the free draining hardfill we consider this is not required. Also it is most likely no seepage will reach the downstream toe, and even if it did would be expected to be only modest flows.
8. Consideration should be given to the detail at the end of the walls ie how seepage is minimised around the end of the wall.

(b) Area Of Observed Seepage Pressure

At this position there is a risk of initiation of erosion by a ground heave mechanism possibly leading to a breach of the stopbank by piping. Although the risk of initiation is high (particularly in floods greater than encountered to date) there must be other factors present for a breach to potentially occur. The gravel soils are unlikely to hold a roof or be highly erodible in seepage flow and thus gross enlargement of a piping hole is unlikely. Some loss of the finer fractions within the matrix may occur, leading to higher permeability and flow rates. In a worst case scenario if sufficient erosion occurred the crest may slump and/or the walls be undermined and then the crest may overtop if the flood is high enough at the time.

The short duration of peak flood loading would reduce this risk. Overall the risk of a breach in say a 1:100 flood event is assessed as moderate to low.

The options to improve stopbank security could involve;

- Seepage reduction measures
- Drainage / buttressing
- Combination of the above

It appears the existing clay cutoff at this location is not fully effective. Seepage reduction measures could involve a deep cut off using plastic concrete or conventional concrete. These however are very expensive solutions and more suited to large dams. Drainage or buttressing are considered more cost effective options. These are described below.

(a) Raising of the ground to add weight. This would involve removal of existing seal and placing fill.
(b) A deep toe drain or similar. This would be a trench backfilled with highly permeable gravel excavated to the maximum practical depth.

Option (b) above is considered most cost effective solution. Further design analyses are recommended to develop the concept, in particular the required geometry, grading and required design standard. Option (a) would be very disruptive as a significant fill depth may be required. With any option there are various practical constraints to be considered.

6.3 Goods Shed

A new section of stopbank up around 1 m high is required adjacent to the existing Goods Shed.

6.3.1 Investigations

Three test pits up to 4 m depth were completed in the Goods Shed area. Fill comprising variable silt, sand, gravel and boulders and was encountered to at least 2 m depth. The soils encountered are generally considered to be an appropriate foundation for the proposed stopbank in terms of strength and potential settlement. Some permeable materials were encountered along with boulders.

6.3.2 Key Considerations

The new stopbank requires a competent foundation, and an appropriate detail for keying the low permeability upstream core zone into the foundation to limit foundation seepage.

All loose, permeable or soft materials require removal from the stopbank footprint, an undercut over the whole footprint of 0.5 to 1 m is envisaged. In places a deeper sub-excavation may be required either over the whole footprint or as a cut off for seepage control. The typical cross section for the new stopbank should incorporate an upstream silt core and downstream free draining shoulder similar to the existing stopbanks in the area. The upstream core zone should be keyed into in situ ground. The recommended new stopbank cross section is indicated in drawing 09828-5.

6.4 Fisherman's Wharf

A freestanding wall around 0.9 m high is proposed for the Fisherman's Wharf section of stopbank.

6.4.1 Investigations

Four test pits were completed in the area. These pits revealed an upstream core zone and free draining bulk fill typical cross section, incorporating a similar cross section and materials to those at Mawhera Quay. It is unlikely however, that the stopbank incorporates the 6 m cut-off zone of Mawhera Quay, as the stopbank is significantly lower at this location.

6.4.2 Key Considerations

It is considered appropriate to use a similar wall detail to that suggested for Mawhera Quay, with the wall being located at the river-side of the existing stopbank crest, and keying into the existing low-permeability upstream core zone. Design loadings and considerations for the wall are anticipated to be similar to those at Mawhera Quay, although additional consideration of wave impact loading and overtopping effects due to the proximity of the site to the river mouth.

6.5 Cobden

The existing stopbank in the area within around 300 m upstream of the existing Range Creek culvert is very steep, and has a narrow cross section and crest width due to the constraint of the adjacent road. Seepage has been noted around and/or beneath the culvert, and remediation of this structure has been raised as item for consideration in our brief. During the site visit, seepage was observed exiting adjacent to the culvert toward the Grey River. It is therefore likely that the seepage direction will reverse during flooding of the river, and the seepage flows will exit toward Cobden.

It is proposed to raise the entire road embankment to achieve the design stopbank height, rather than attempting to raise the already steep and narrow existing banks adjacent to the road. In the Range Creek culvert location, new culvert sections will be added on either side of the existing structure, and earth fill placed to tie in to the existing stopbank batter.

6.5.1 Investigations

Three test pits and one drill hole were completed in the area. The test pits determined that the river side low permeability facing is present on the stopbank.

The drill hole identified sandy gravel beneath the culvert level (base of stopbank fill). The in situ foundation material is likely to be highly permeable, and it is also considered likely that seepage along the interface of the culverts with natural ground and backfill is occurring. Design details of the wing wall extensions have been sighted, but nothing of the original wing wall and culvert installation which apparently predates the stopbank upgrade of the late 1980's. No internal inspection of the culverts was undertaken however it is considered likely that settlement of the culverts has occurred to some extent, as the stopbank height has been raised at least once following original construction.

6.5.2 Key Considerations

RILEY supports the idea of raising the road embankment across its full width in this area. The existing road surface should be removed and the upstream core be extended appropriately, as indicated in drawing 09828-5 attached.

At the culvert location, the recommended detail for limiting seepage is a new earth liner layer within the fill surrounding the culvert extension. There is the potential for seepage pressure from either direction (i.e. the Grey River side during flood, and the Cobden side during normal operation/local rainfall events). Therefore the recommended detail incorporates an

internal low permeability core zone on the Grey River side of the culvert, with a supporting shoulder of general stopbank fill material. This arrangement is indicated in drawing 09828-6. It is important that the low permeability core zone is well keyed into the existing low permeability facing layer on the river-side stopbank batter. The previously noted possibility of culvert settlement raises the potential for seepage originating from pipe joints, and it is recommended that an internal inspection of the culverts be completed as part of the structure upgrade.

In the culvert location, the founding level for compacted fill is beneath river level, and occupies the normal drainage path for the Cobden estuary area. Construction will therefore require careful planning and execution, with consideration given to drainage so that fill quality is not adversely affected by water within the excavation. Very high compaction standards are required below and around the pipes in particular.

7.0 Summary of Main Points

1. Investigations have been completed with the purpose of assisting the overall design of the upgrade project. There have been no major issues identified which could detrimentally affect the project, although in some areas challenging ground conditions have been identified requiring specific measures to minimise risk to an acceptably low level.
2. As expected the two Bridges section had the most challenging ground conditions, i.e. soft founding soils requiring undercutting and high groundwater levels.
3. Recommendations are included in this report for each of the areas investigated.
4. Confirmation of assumptions will be required during construction to ensure that the design objectives are fulfilled, and appropriate action taken if conditions differ from those encountered to date. Recommended construction methods and inspection procedures are included in appendix 5: Construction Specification Clauses.

8.0 Limitation

This report has been prepared solely for the benefit of Good Earth Matters as our client with respect to the brief. The reliance by other parties on the information or opinions contained in the report shall, without our prior review and agreement in writing, be at such parties' sole risk.

Recommendations and opinions in this report are based on data from limited test positions. The nature and continuity of subsoil conditions away from the test positions are inferred, and it must be appreciated that actual conditions could vary considerably from the assumed model.

During excavation and construction the site should be examined by an engineer or engineering geologist competent to judge whether the exposed subsoils are compatible with the inferred conditions on which the report has been based. It is possible that the nature of the exposed subsoils may require further investigation and the modification of the design based upon this report.

Riley Consultants Ltd would be pleased to provide this service to Good Earth Matters and believes the project would benefit from such continuity. In any event, it is essential Riley

Consultants Ltd is contacted if there is any variation in subsoil conditions from those described in the report as it may affect the design parameters recommended in the report.

9.0 References

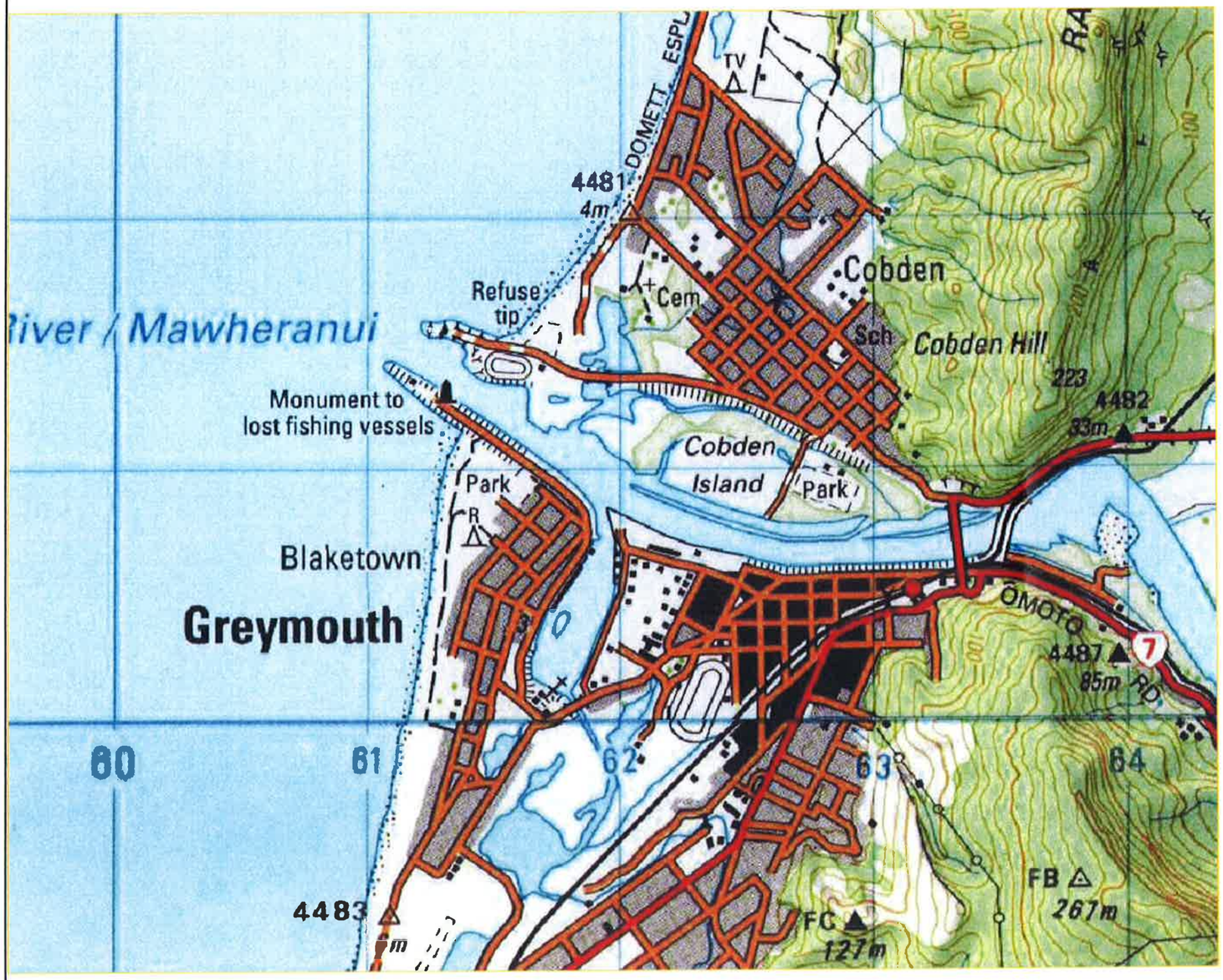
1 Nathan, S (1978) *1:63,360 Scale Geological Map, Sheet S44 Greymouth*. New Zealand Geological Survey.

2 Young A.J.A. (1998) *Review of Condition of Greymouth Floodwall*. RiskCorp Australia Pty Ltd

3 Hall R.J. (1999) *Report: Greymouth Flood Protection: System Integrity.* Civil & Environmental Consulting Ltd.

APPENDIX 1

Drawings



LOCATION PLAN
SCALE 1:20000

GOOD EARTH MATTERS

GREYMOUTH FLOOD WALL, GREYMOUTH

DRAWING INDEX - TENDER ISSUE
NOVEMBER 2008

DRAWING NUMBER	DRAWING NAME	DRAWING REVISION
09828-0	LOCATION PLAN & DRAWING LIST	0
09828-1	GEOTECHNICAL INVESTGATION – SITE PLAN – SHEET 1 OF 3	0
09828-2	GEOTECHNICAL INVESTGATION – SITE PLAN – SHEET 2 OF 3	0
09828-3	GEOTECHNICAL INVESTGATION – SITE PLAN – SHEET 3 OF 3	0
09828-4	GEOTECHNICAL INVESTGATION – CROSS SECTIONS AT 2 BRIDGES SITE	0
09828-5	CONCEPTUAL STOPBANK RAISING DETAILS	0
09828-6	RANGE CREEK CULVERT UPGRADE – CONCEPT DRAWING	0
09828-7	GEOTECHNICAL INVESTGATION – CLINOMETER CROSS SECTIONS	0
09828-8	GEOTECHNICAL INVESTGATION – CLINOMETER CROSS SECTIONS	0
09828-9	GEOTECHNICAL INVESTGATION – CLINOMETER CROSS SECTION	0

CONCEPTUAL - NOT FOR CONSTRUCTION

REV	DESCRIPTION	BY	DATE
0	FIRST ISSUE		

DESIGN TS | CHECKED
DRAWN HN | CHECKED
DATE DRAWN 09/2008

APPROVED FOR ISSUE: DRAFT
DATE: / /

RILEY CONSULTANTS
P.O.BOX 4355 CHRISTCHURCH
TEL. 03-3794402
FAX. 03-3794403

TITLE
GOOD EARTH MATTERS
GREYMOUTH FLOOD WALL, GREYMOUTH
LOCATION PLAN AND DRAWING LIST

CADFILE 09828-0
SCALES (A3) AS SHOWN
ACENZ
DRAWING No. 09828-0
REV. 0

REV	DESCRIPTION	BY	DATE
0	FIRST ISSUE		

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DRAWN MP | CHECKED
DATE DRAWN SEPT. 2009

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RILEY CONSULTANTS
P.O.BOX 100 253
N.S.M.C.
AUCKLAND
TEL. 09-4897872
FAX. 09-4897873

TITLE
GOOD EARTH MATTERS
GREYMOUTH FLOOD WALL, GREYMOUTH
GEOTECHNICAL INVESTIGATION - SITE PLAN - SHEET 1 OF 3

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DRAWING No. 09828-1
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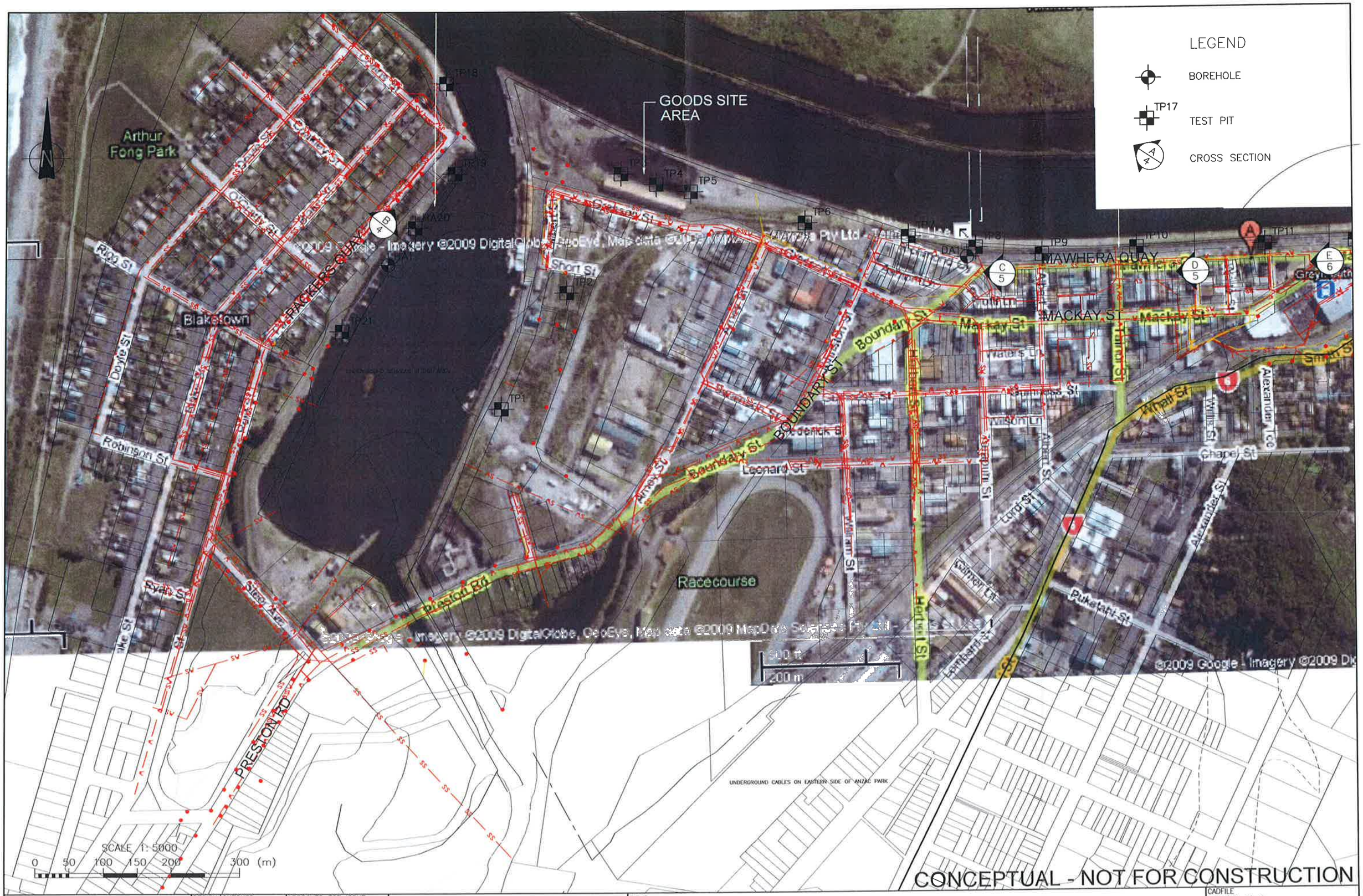

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RILEY CONSULTANTS
P.O.BOX 100 253
N.S.M.C.
AUCKLAND
TEL. 09-4897872
FAX. 09-4897873

TITLE
GOOD EARTH MATTERS
GREYMOUTH FLOOD WALL, GREYMOUTH
GEOTECHNICAL INVESTIGATION - SITE PLAN - SHEET 2 OF 3

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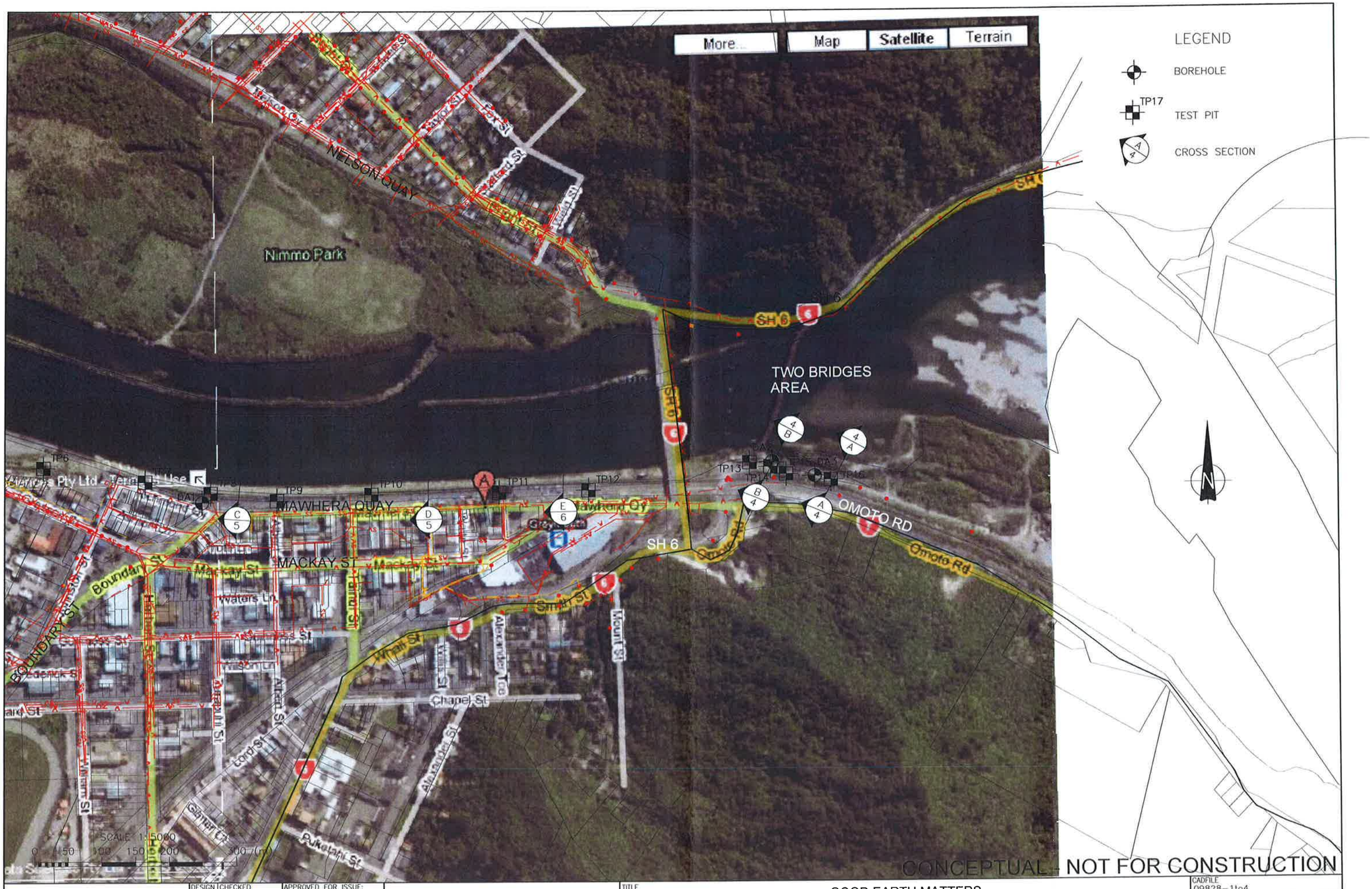

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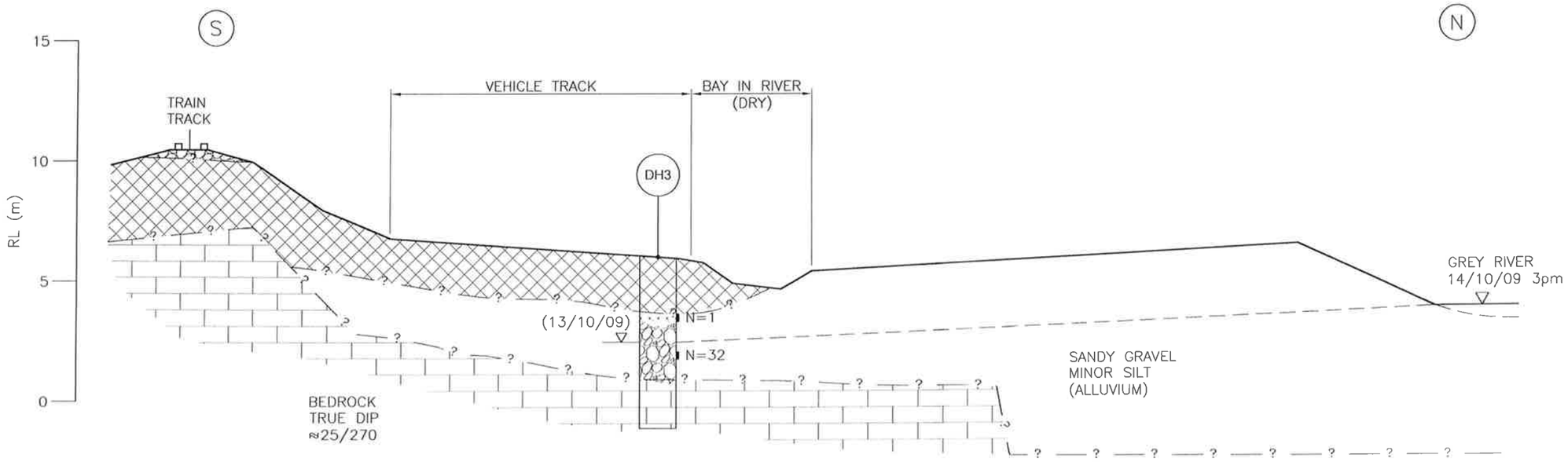

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SECTION A/1

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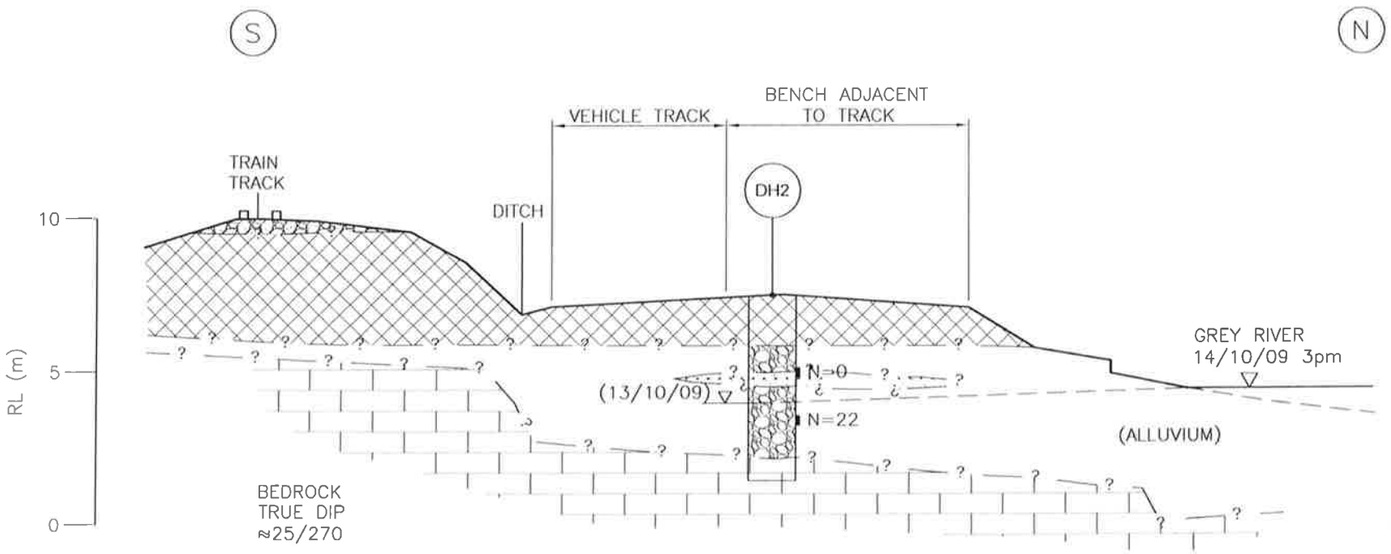

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SECTION B/1

SCALE 1:200

LEGEND

MATERIALS

- SANDY GRAVEL (FILL)
- SILT, LOCAL ORGANICS
- SANDY GRAVEL
- (ALLUVIUM)
- BEDROCK (COBDEN LIMESTONE)

CONTACTS

- KNOWN
- APPROXIMATE
- INFERRED

- DH3 — DRILL HOLE LOCATION (150mm DIA CONCENTRIC WIDTH NOT TO SCALE)
- N=22 — SPT TEST (NZ STANDARDS)
- GROUND WATER (DATE MEASURED)

NOTES:-

1. GROUND PROFILE PRODUCED FROM TAPE CLINOMETER SURVEY
2. ELEVATIONS APPROXIMATED FROM GPS
3. SOIL DESCRIPTIONS ARE SIMPLIFIED, REFER TO REPORT AND BORE LOSS FOR DETAILS

CONCEPTUAL - NOT FOR CONSTRUCTION

REV	DESCRIPTION	BY	DATE
0	FIRST ISSUE		

DESIGN AvD | CHECKED
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DATE DRAWN NOV 09

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RILEY CONSULTANTS
P.O.BOX 100 253
N.S.M.C.
AUCKLAND
TEL. 09-4897872
FAX. 09-4897873

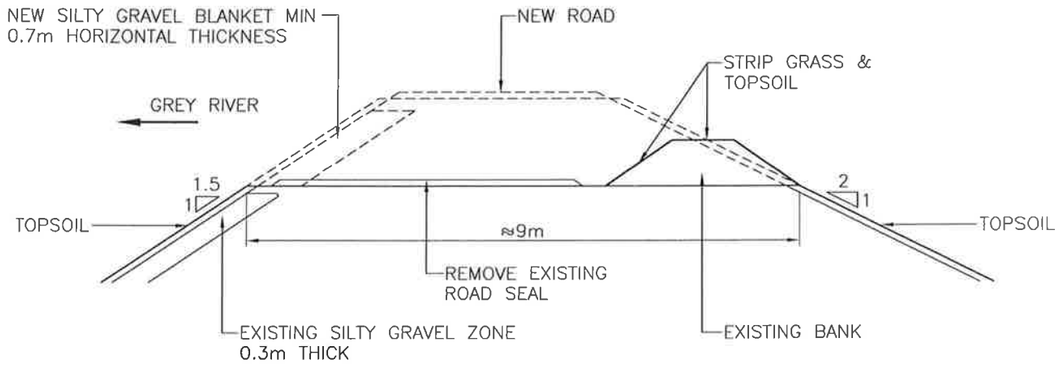
TITLE

GOOD EARTH MATTERS

GREYMOUTH FLOOD WALL, GREYMOUTH

GEOTECHNICAL INVESTIGATION - CROSS SECTIONS AT 2 BRIDGES SITE

CADFILE 09828-1to4
SCALES (A3) AS SHOWN
DRAWING No. 09828-4
REV. 0
ACENZ



COBDEN NEAR RANGE CREEK CULVERT

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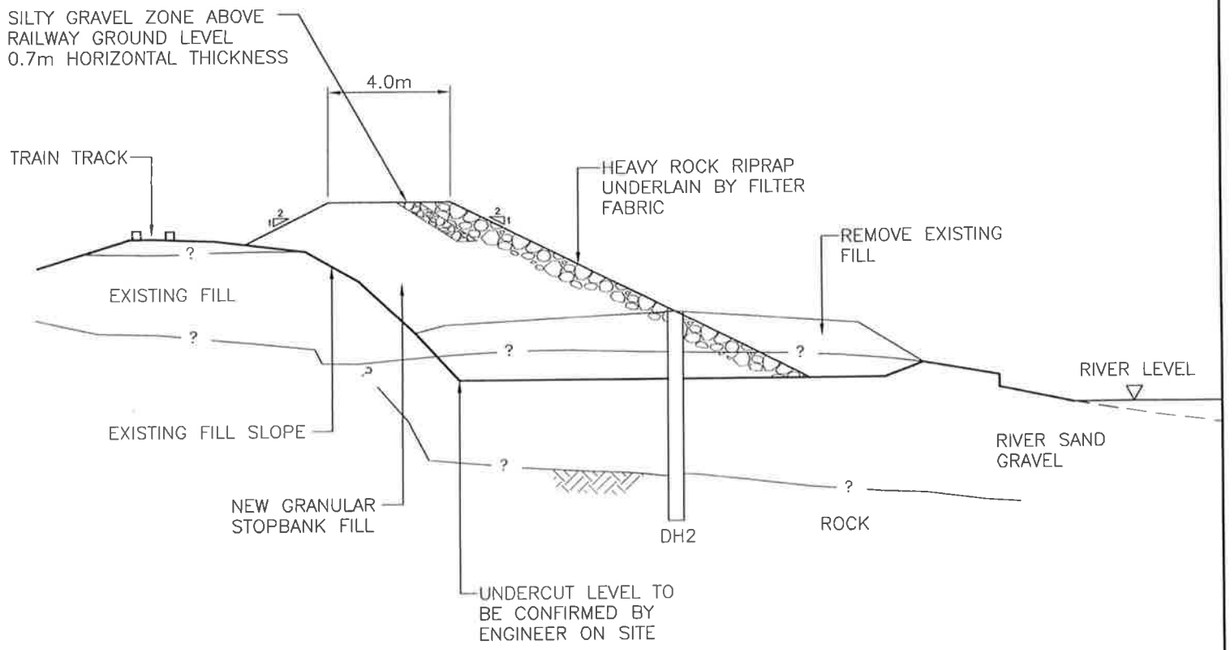
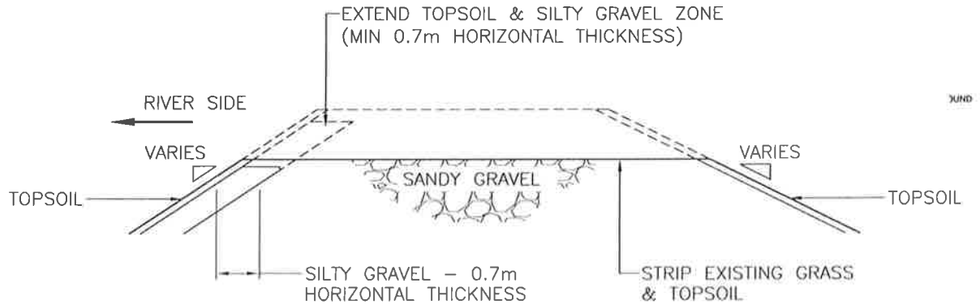


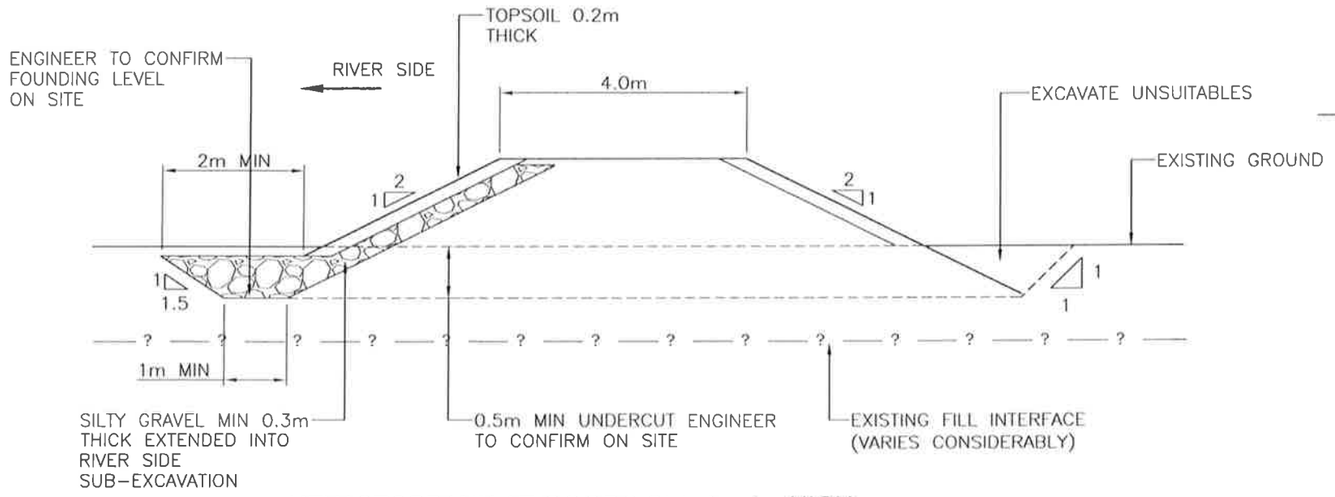
2 BRIDGES AREA

SCALE 1:200



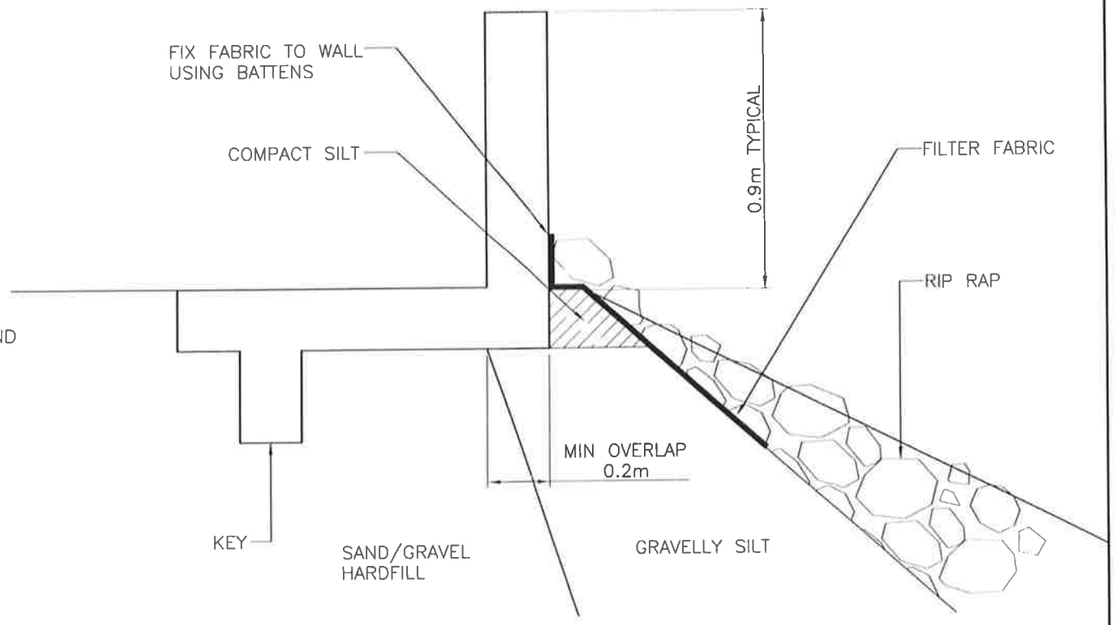
GENERAL STOPBANK RAISE 0.2m TO 0.6m

SCALE 1:100 (APPROX)



NEW STOPBANK AT GOODS SHED ≈ 1m HIGH

SCALE 1:100 (APPROX)

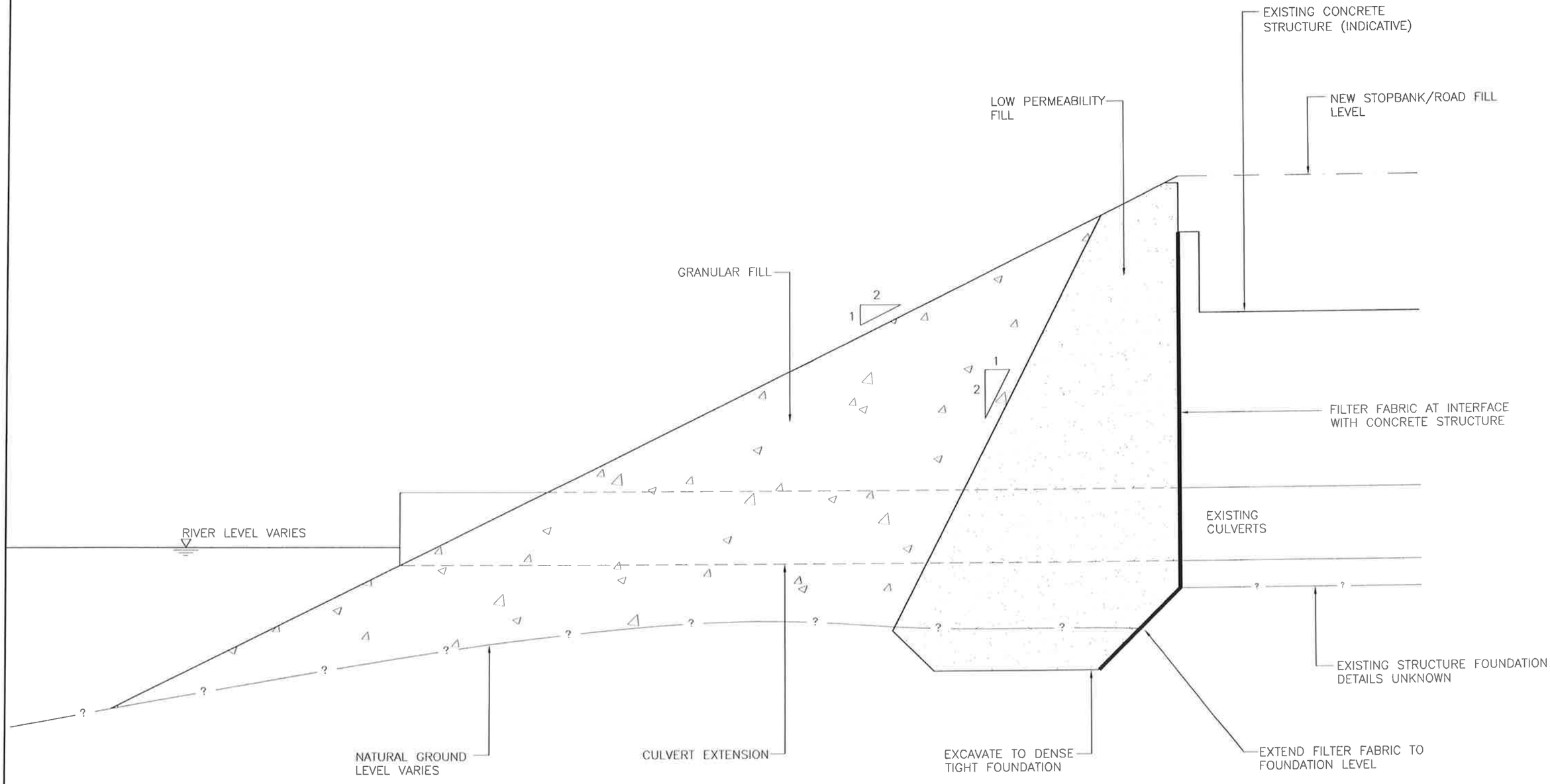


CONCRETE FLOOD WALL - MAWHERA QUAY & FISHERMAN'S WARF

SCALE 1:20 (APPROX)

CONCEPTUAL - NOT FOR CONSTRUCTION

		DESIGN TS	CHECKED	APPROVED FOR ISSUE: DRAFT	RILEY CONSULTANTS P.O.BOX 4355 CHRISTCHURCH TEL. 03–3794402 FAX. 03–3794403	TITLE: GOOD EARTH MATTERS GREYMOUTH FLOOD WALL, GREYMOUTH CONCEPTUAL STOPBANK RAISING DETAILS	CADFILE 09828–5&6 SCALES (A3) AS SHOWN
		DRAWN HN	CHECKED				DRAWING No. 09828-5 / REV. 0
0	FIRST ISSUE			DATE: / /			ACENZ
REV	DESCRIPTION	BY	DATE	DATE DRAWN NOV 09			



CONCEPTUAL RANGE CREEK CULVERT UPGRADE

SCALE 1:50 (APPROX)

CONCEPTUAL - NOT FOR CONSTRUCTION

REV	DESCRIPTION	BY	DATE
0	FIRST ISSUE		

DESIGN: TS | CHECKED:
DRAWN: HN | CHECKED:
DATE DRAWN: NOV 09

APPROVED FOR ISSUE: DRAFT
DATE: / /

RILEY CONSULTANTS
P.O.BOX 4355 CHRISTCHURCH
TEL. 03-3794402
FAX. 03-3794403

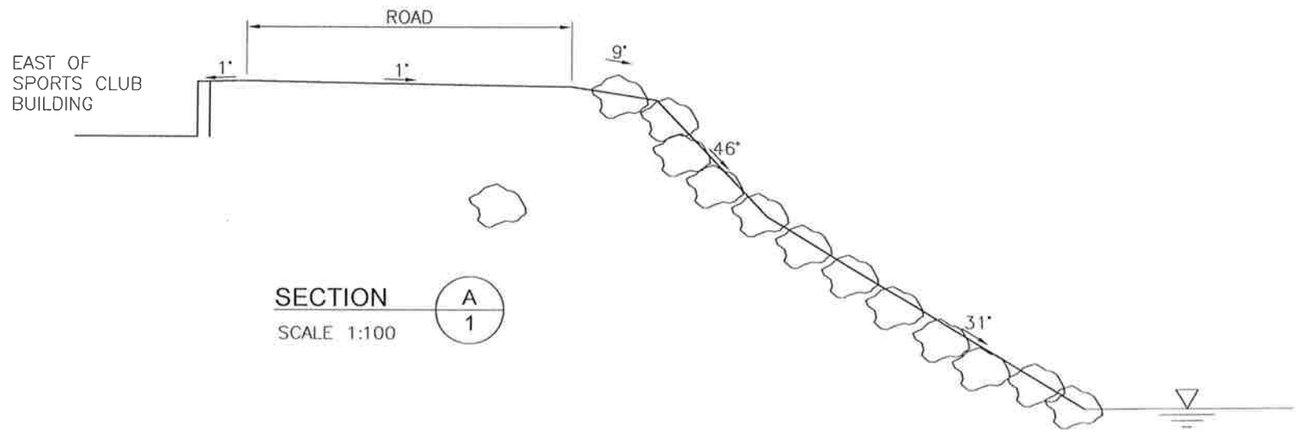
TITLE

GOOD EARTH MATTERS

GREYMOUTH FLOOD WALL, GREYMOUTH

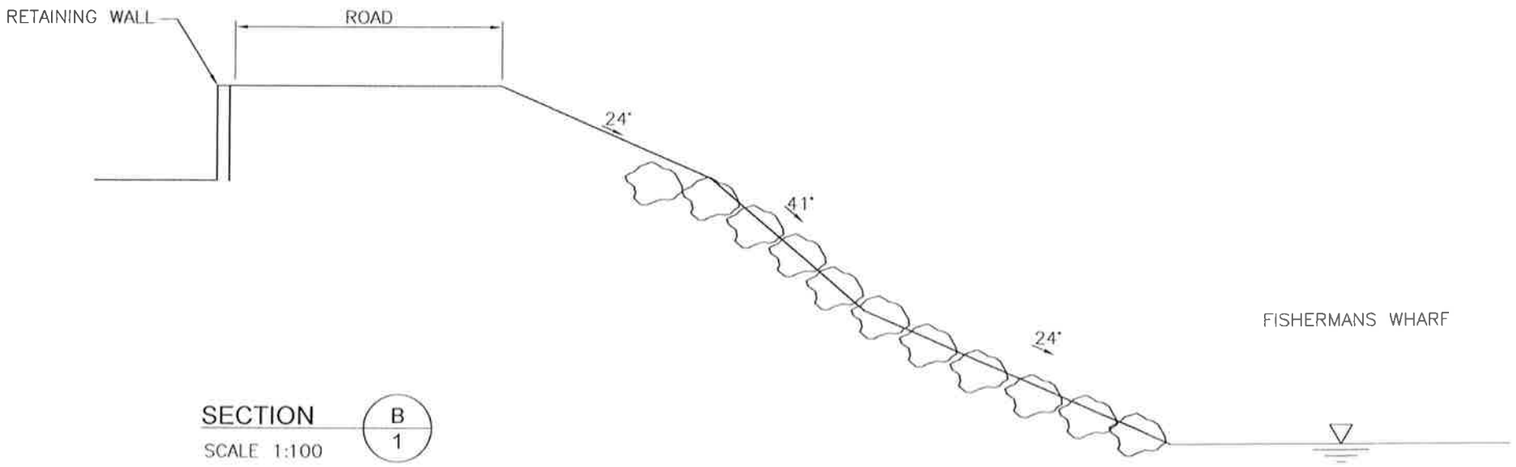
RANGE CREEK CULVERT UPGRADE - CONCEPT DRAWING

CADFILE: 09828-5&6
SCALES (A3): AS SHOWN
ACENZ
DRAWING No.: 09828-6
REV.: 0



SECTION A/1

SCALE 1:100



SECTION B/1

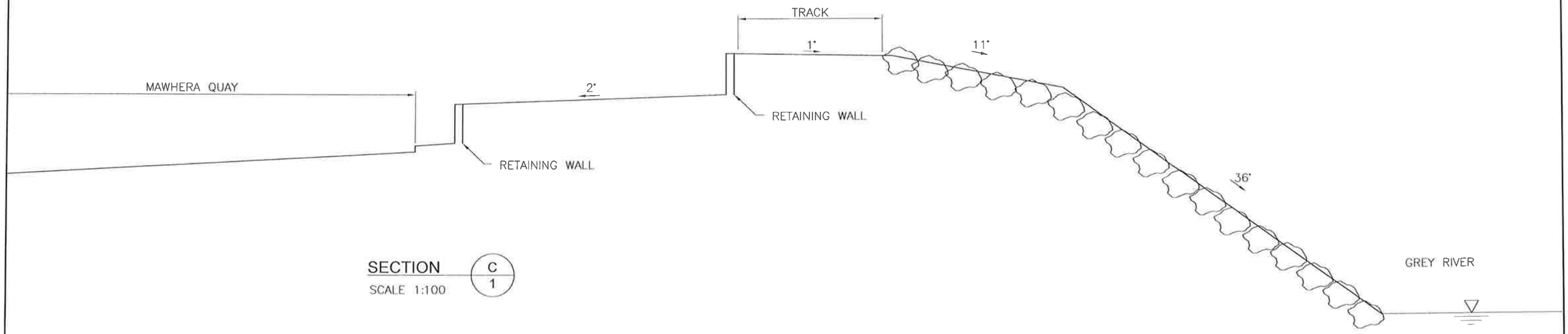
SCALE 1:100

SCALE 1: 100

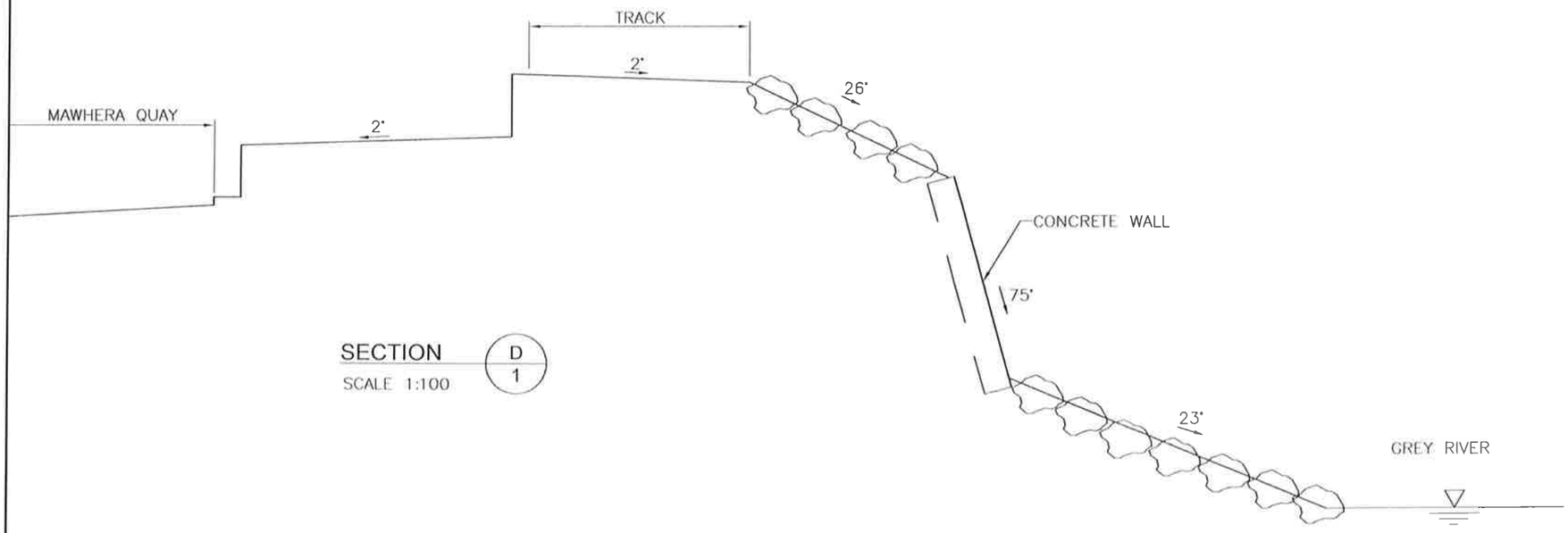
0 1 2 3 4 6 (m)

CONCEPTUAL - NOT FOR CONSTRUCTION

		DESIGN MJB	CHECKED	APPROVED FOR ISSUE: DRAFT	RILEY CONSULTANTS P.O.BOX 100 253 N.S.M.C. AUCKLAND TEL. 09-4897872 FAX. 09-4897873	TITLE GOOD EARTH MATTERS GREYMOUTH FLOOD WALL, GREYMOUTH GEOTECHNICAL INVESTIGATION - CLINOMETER CROSS SECTIONS	CADFILE 08828-7to9
		DRAWN JM	CHECKED				SCALES (A3) 1:100
0	FIRST ISSUE	DATE DRAWN SEPT 2009		DATE: / /			ACENZ DRAWING No. 08828-7 REV. 0
REV	DESCRIPTION BY DATE						



SECTION C/1
SCALE 1:100



SECTION D/1
SCALE 1:100

SCALE 1:100
0 1 2 3 4 6 (m)

CONCEPTUAL - NOT FOR CONSTRUCTION

REV	DESCRIPTION	BY	DATE
0	FIRST ISSUE		

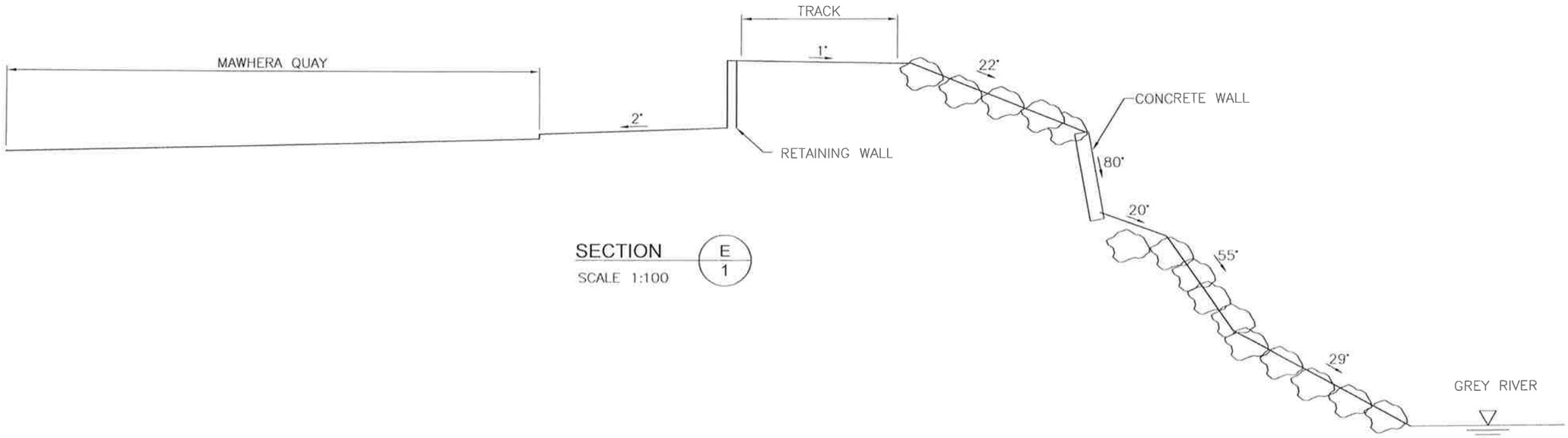
DESIGN MJB | CHECKED
DRAWN JM | CHECKED
DATE DRAWN SEPT 2009

APPROVED FOR ISSUE: DRAFT
DATE: / /

RILEY CONSULTANTS
P.O.BOX 100 253
N.S.M.C.
AUCKLAND
TEL. 09-4897872
FAX. 09-4897873

TITLE
GOOD EARTH MATTERS
GREYMOUTH FLOOD WALL, GREYMOUTH
GEOTECHNICAL INVESTIGATION - CLINOMETER CROSS SECTIONS

CADFILE 08828-7to9
SCALES (A3) 1:100
ACENZ
DRAWING No. 08828-8
REV. 0



SECTION E/1

SCALE 1:100

SCALE 1: 100

0 1 2 3 4 6 (m)

CONCEPTUAL - NOT FOR CONSTRUCTION

			DESIGN MJB / CHECKED	APPROVED FOR ISSUE: DRAFT	RILEY CONSULTANTS P.O.BOX 100 253 N.S.M.C. AUCKLAND TEL. 09-4897872 FAX. 09-4897873	TITLE: GOOD EARTH MATTERS GREYMOUTH FLOOD WALL, GREYMOUTH GEOTECHNICAL INVESTIGATION - CLINOMETER CROSS SECTION
0	FIRST ISSUE		DRAWN JM / CHECKED			CADFILE 08828-7to9
REV	DESCRIPTION	BY DATE	DATE DRAWN SEPT 2009	DATE: / /		SCALES (A3) 1:100
						ACENZ DRAWING No. 08828-9 REV. 0

APPENDIX 2

Geotechnical Logs

Riley Consultants Ltd
4 Fred Thomas Drive
Takapuna, AKL
Tel: 09 4897872
Fax: 09 4897873

TEST PIT LOG

Project: Greymouth Flood	Location: Greymouth	Hole position: Crest of stopbank	No.: TP1
Job No.: 09828	Start Date: Finish Date:	Ground Level (m):	Co-Ordinates ():
Client: Good Earth Matters	Hole Depth: 1.00 m		Sheet: 1 of 1

Elevation (m)	Depth (m)	Geological Description	Legend	Weathering	Field Strength	Defect Description	Samples	Tests
	0.70	SILT; trace clay, very large angular limestone boulder inclusions up to 300mmø						No. 1 1, 2, 1, 2, 2, 1, 3, 2, 3, 4, 20
	1.00	medium to coarse gravelly SAND; minor cobbles, grey, well graded, non plastic, gravels and cobbles are rounded greywacke						No. 2 2, 1, 2, 1, 1, 2, 2, 2, 2, 2, 2, 2, 2, 2, 1, 2, 2, 2, 2, 2
		EOH @ 1.00 m						

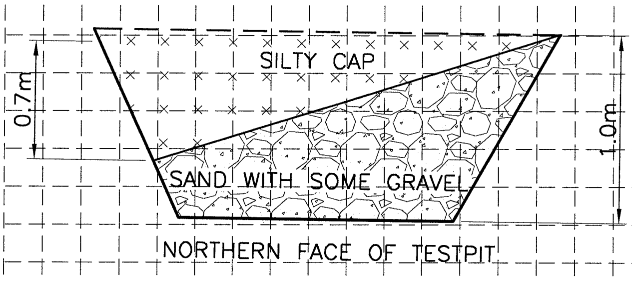
Geological Description: Soil Description: subordinate, praticle size, MAJOR, minor; colour, structure; strength; moisture condition; grading; bedding; plasticity; sensitivity; major qualifications; weathering of clasts; subordinate qualifications; minor qualifications; additional structure; (GEOLOGIC UNIT). Rock Description: weathering; colour; texture; fabric and orientation; NAME; strength; additional description, (GEOLOGIC UNIT).

Weathering: RS CW HW MW SW UW

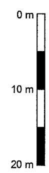
Field Strength: Soil | Rock — VS/VL S/L F/MD St/D VSt/VD H/EW VW W MS S VS ES

Defect Description (type, orientation, spacing, roughness, persistence aperture, infilling etc)

SKETCH:



MAP



1:1000

Shoring/Support:
Stability:

A B C D

- Small Disturbed Sample
- Large Disturbed Sample
- U100 Undisturbed Sample
- Permeability Test
- Schmidt Hammer
- Insitu Vane Shear Strength (kPa) P=Peak, R=Residual, UTP=Unable to penetrate
- Scala Penetrometer - blows/50mm

GROUNDWATER
- [ ] None
- [ ] Slow Seep (depth)
- [ ] Rapid Inflow (depth)

PIT TERMINATED DUE TO:
- [X] Target depth
- [ ] Flooding
- [ ] Refusal
- [ ] Machine limit

Remarks

All dimensions in metres Scale 1:50		Shear Vane No.	Logged by: MJB	Checked by:

RILEYAKL.GLB Log RILEY TP 09828.GPJ <<DrawingFile>> 06/10/2009 11:16 Produced by gINT Professional

RILEY CONSULTANTS
Engineers and Geologists

Riley Consultants Ltd
4 Fred Thomas Drive
Takapuna, AKL
Tel: 09 4897872
Fax: 09 4897873

TEST PIT LOG

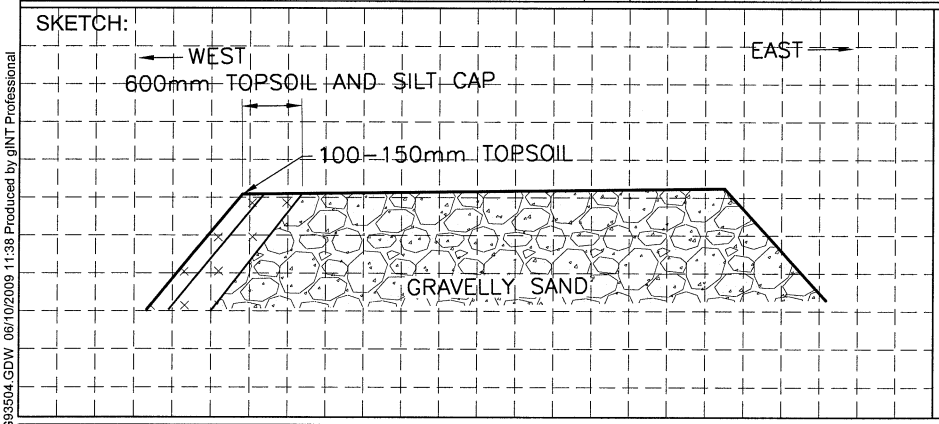
Project:	Location:	Hole position:	No.:
Greymouth Flood	Greymouth	stopbank	TP2

Job No.:	Start Date: 17-09-09 Finish Date:	Ground Level (m):	Co-Ordinates ():
09828			

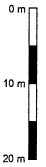
Client:	Hole Depth:	Sheet:
Good Earth Matters	1.00 m	1 of 1

Elevation (m)	Depth (m)	Geological Description	Legend	Weathering	Field Strength	Defect Description	Samples	Tests
		Soil Description: subordinate, praticle size, MAJOR, minor; colour, structure; strength; moisture condition; grading; bedding; plasticity; sensitivity; major qualifications; weathering of clasts; subordinate qualifications; minor qualifications; additional structure; (GEOLOGIC UNIT). Rock Description: weathering; colour; texture; fabric and orientation; NAME; strength; additional description, (GEOLOGIC UNIT).		RS CW HW MW SW UW	Soil: VS/VL S F St H; Rock: EW W MS S VS ES	(type, orientation, spacing, roughness, persistence aperture, infilling etc)		
	0.60	SILT; trace to minor clay, minor large angular gravels up to 100-300mm across						No. 1 0, 1, 1, 1, 0, 1, 2, 2, 5, 2, 0, 0, 1, 5, 2, 3, 3, 6, 3
	1.00	gravelly SAND; rounded greywacke gravels generally up to 150mmø, occasionally up to 300mmø						No. 2 1, 1, 1, 2, 3, 3, 2, 2, 3, 4, 7, 8, 6, 5, 6, 6, 5, 5, 5
	1	EOH @ 1.00 m						
	2							
	3							
	4							
	5							

SKETCH:

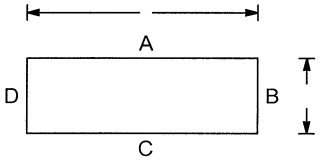


MAP



1:1000

Shoring/Support:
Stability:



- Small Disturbed Sample
- Large Disturbed Sample
- U100 Undisturbed Sample
- Permeability Test
- Schmidt Hammer
- Insitu Vane Shear Strength (kPa) P=Peak, R=Residual, UTP=Unable to penetrate
- Scala Penetrometer - blows/50mm

GROUNDWATER ☐ None
☐ Slow Seep (depth)
☐ Rapid Inflow (depth)

PIT TERMINATED DUE TO:
☒ Target depth ☐ Flooding
☐ Refusal ☐ Machine limit

Remarks

All dimensions in metres Scale 1:50		Shear Vane No.	Logged by: MJB	Checked by:

RILEYAKL.GLB Log RILEY TP 09828.GPJ DWG93504.GDW 06/10/2009 11:38 Produced by gINT Professional

RILEY CONSULTANTS
Engineers and Geologists

Riley Consultants Ltd
4 Fred Thomas Drive
Takapuna, AKL
Tel: 09 4897872
Fax: 09 4897873

TEST PIT LOG

Project:	Location:	Hole position:	No.:
Greymouth Flood	Greymouth	Western end good shed	TP3

Job No.:	Start Date: 17-09-09 Finish Date:	Ground Level (m):	Co-Ordinates ():
09828			

Client:	Hole Depth:	Sheet:
Good Earth Matters	3.70 m	1 of 1

Elevation (m)	Depth (m)	Geological Description	Legend	Weathering	Field Strength	Defect Description	Samples	Tests
	0.30	[FILL] sandy GRAVELS; mixed with coal gravels up to 100mm (rounded), black						
	0.90	no coal, gravels up to 300mmø, light grey						
	1.20	gap 40mm road chip, angular, dark brown						
	1.70	coarse SAND; trace to minor rounded greywacke gravels, 80mmø to <20mmø, light brown						
	2.50	SILT; some clay, trace sand, yellow/orange/brown, moderately plastic, minor - some gravels & boulders up to 500mm across (greatest dimension) gravels very light grey/brown white						
	3.70	clayey SILT; greenish grey, angular limestone boulders <300mm greatest dimension						
		EOH @ 3.70 m						

Soil Description: subordinate, particle size, MAJOR, minor; colour, structure; strength; moisture condition; grading; bedding; plasticity; sensitivity; major qualifications; weathering of clasts; subordinate qualifications; minor qualifications; additional structure; (GEOLOGIC UNIT).
Rock Description: weathering; colour; texture; fabric and orientation; NAME; strength; additional description, (GEOLOGIC UNIT).

Weathering: RS CW HW MW SW UW
Field Strength: Soil VSVL SFT FIRM STIFF VSTIFF HARD — Rock VW W MS S VS ES
Defect Description: (type, orientation, spacing, roughness, persistence aperture, infilling etc)
Samples
Tests

No. 1
0, 1, 2,
2, 2, 3,
5, 5, 4,
5, 4, 4,
5, 2, 2,
5, 20

SKETCH:

MAP

0 m
10 m
20 m
1:1000

Shoring/Support:
Stability:

A
B
C
D

- Small Disturbed Sample
- Large Disturbed Sample
- U100 Undisturbed Sample
- Permeability Test
- Schmidt Hammer
- Insitu Vane Shear Strength (kPa) P=Peak, R=Residual, UTP=Unable to penetrate
- Scala Penetrometer - blows/50mm

GROUNDWATER
- [ ] None
- [ ] Slow Seep (depth)
- [ ] Rapid Inflow (depth)

PIT TERMINATED DUE TO:
- [X] Target depth
- [ ] Flooding
- [ ] Refusal
- [ ] Machine limit

Remarks

All dimensions in metres Scale 1:50		Shear Vane No.	Logged by: MJB	Checked by:

RILEYAKL.GLB Log RILEY TP 09828.GPJ <<DrawingFile>> 06/10/2009 12:37 Produced by gINT Professional

RILEY CONSULTANTS Engineers and Geologists
Riley Consultants Ltd
4 Fred Thomas Drive
Takapuna, AKL
Tel: 09 4897872
Fax: 09 4897873

TEST PIT LOG

Project:	Location:	Hole position:	No.:
Greymouth Flood	Greymouth	Mid of good shed	TP4

Job No.:	Start Date: 17-09-09 Finish Date:	Ground Level (m):	Co-Ordinates ():
09828			

Client:	Hole Depth:	Sheet:
Good Earth Matters	3.70 m	1 of 1

Elevation (m)	Depth (m)	Geological Description	Legend	Weathering	Field Strength	Defect Description	Samples	Tests
	0.30	[FILL] SAND; some coal and rounded greywacke gravels and cobbles						No. 1 1, 2, 20 PSD test
	1.10	generally no coal, medium to coarse gravelly SAND; minro cobbles, grey, non plastic, gravels and cobbles are rounded greywacke						
	2.10	SILT; minor clay, trace sand, minor limestone boulder, boulders up to 300mm across, occasionally up to 500mm, yellowish brown, orange and light grey/brown staining						No. 2 1, 1, 1, 6, 3, 3, 2, 6, 7, 3, 5, 3, 8, 4, 9, 4, 3, 7, 4
	3.70	course SAND; minor to some rounded greywacke gravels and cobbles						
		EOH @ 3.70 m						

Soil Description: subordinate, praticle size, MAJOR, minor; colour, structure; strength; moisture condition; grading; bedding; plasticity; sensitivity; major qualifications; weathering of clasts; subordinate qualifications; minor qualifications; additional structure; (GEOLOGIC UNIT).
Rock Description: weathering; colour; texture; fabric and orientation; NAME; strength; additional description, (GEOLOGIC UNIT).

Weathering: RS CW HW MW SW UW
Field Strength — Soil: VSoft Soft FIRM STIFF VSTIFF HARD — Rock: VW W MS S VS ES

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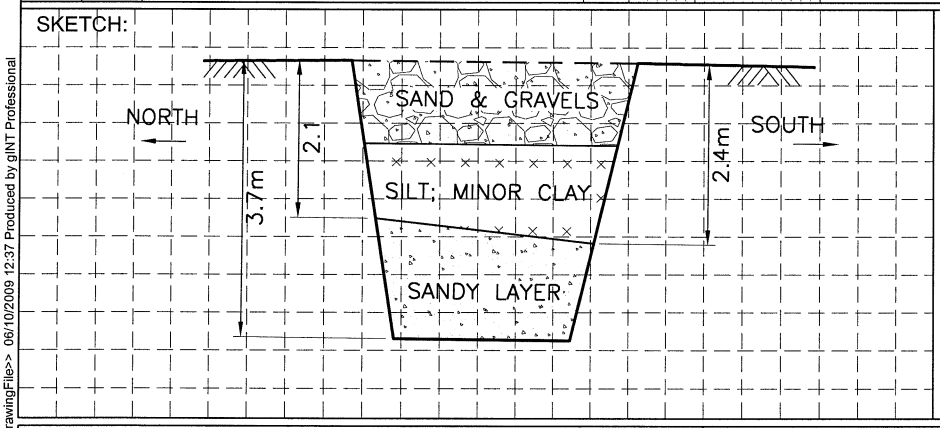

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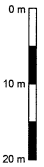
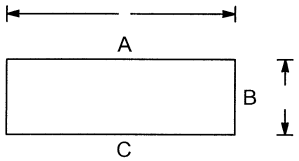


1:1000

Shoring/Support:
Stability:



- Small Disturbed Sample
- Large Disturbed Sample
- U100 Undisturbed Sample
- Permeability Test
- Schmidt Hammer
- Insitu Vane Shear Strength (kPa) P=Peak, R=Residual, UTP=Unable to penetrate
- Scala Penetrometer - blows/50mm

GROUNDWATER
- [ ] None
- [ ] Slow Seep (depth)
- [ ] Rapid Inflow (depth)

PIT TERMINATED DUE TO:
- [X] Target depth
- [ ] Flooding
- [ ] Refusal
- [ ] Machine limit

Remarks

All dimensions in metres Scale 1:50		Shear Vane No.	Logged by: MJB	Checked by:

RILEYAKL.GLB Log RILEY TP 09828.GPJ <<DrawingFile>> 06/10/2009 12:37 Produced by gINT Professional

Riley Consultants Ltd
4 Fred Thomas Drive
Takapuna, AKL
Tel: 09 4897872
Fax: 09 4897873

TEST PIT LOG

Project: Greymouth Flood	Location: Greymouth	Hole position: East end good shed	No.: TP5
Job No.: 09828	Start Date: 17-09-09 Finish Date:	Ground Level (m):	Co-Ordinates ():
Client: Good Earth Matters	Hole Depth: 3.90 m		Sheet: 1 of 1

Geological Description: Soil Description: subordinate, praticle size, MAJOR, minor; colour, structure; strength; moisture condition; grading; bedding; plasticity; sensitivity; major qualifications; weathering of clasts; subordinate qualifications; minor qualifications; additional structure; (GEOLOGIC UNIT). Rock Description: weathering; colour; texture; fabric and orientation; NAME; strength; additional description, (GEOLOGIC UNIT).

Defect Description (type, orientation, spacing, roughness, persistence aperture, infilling etc)

Depth (m)	Geological Description
0.40	[FILL] medium to coarse gravelly SAND; coal, minor cobbles, grey, non plstic, gravels and cobbles are rounded greywacke
0.65 – 0.95	silty gravelly SAND; gravels are fine to coarse grained, well graded, rounded greywacke
1.10	minor angular limestone gravels <40mmø, coal inclusions, generally dark brown-black
	predominantly medium brown, no coal
2.20	sandy gravelly SILT; minor clay, angular to subangular limestone boulders up to 700mm across
2.90	SAND; medium grained gravels and boulders, minor rounded greywacke gravels, grey, non plastic, pocekts of limestone gravels with silty weathered material void infill
3.90	gravelly SAND; light medium grey, gravels are fine to coarse grained, rounded greywacke, occasional rounded greywacke cobbles, trace angular limestone cobbles - boulders
	EOH @ 3.90 m

SKETCH:

MAP

0 m, 10 m, 20 m — 1:1000

Shoring/Support:
Stability:

A, B, C, D

- Small Disturbed Sample
- Large Disturbed Sample
- U100 Undisturbed Sample
- Permeability Test
- Schmidt Hammer
- Insitu Vane Shear Strength (kPa) P=Peak, R=Residual, UTP=Unable to penetrate
- Scala Penetrometer - blows/50mm

GROUNDWATER: ☐ None ☐ Slow Seep (depth) ☐ Rapid Inflow (depth)

PIT TERMINATED DUE TO: ☒ Target depth ☐ Flooding ☐ Refusal ☐ Machine limit

Remarks

All dimensions in metres Scale 1:50		Shear Vane No.	Logged by: MJB	Checked by:

RILEYAKL.GLB Log RILEY TP 09828.GPJ <<DrawingFile>> 06/10/2009 12:37 Produced by gINT Professional

RILEY CONSULTANTS
Engineers and Geologists

Riley Consultants Ltd
4 Fred Thomas Drive
Takapuna, AKL
Tel: 09 4897872
Fax: 09 4897873

TEST PIT LOG

Project:	Location:	Hole position:	No.:
Greymouth Flood	Greymouth	Crest of stopbank	TP6

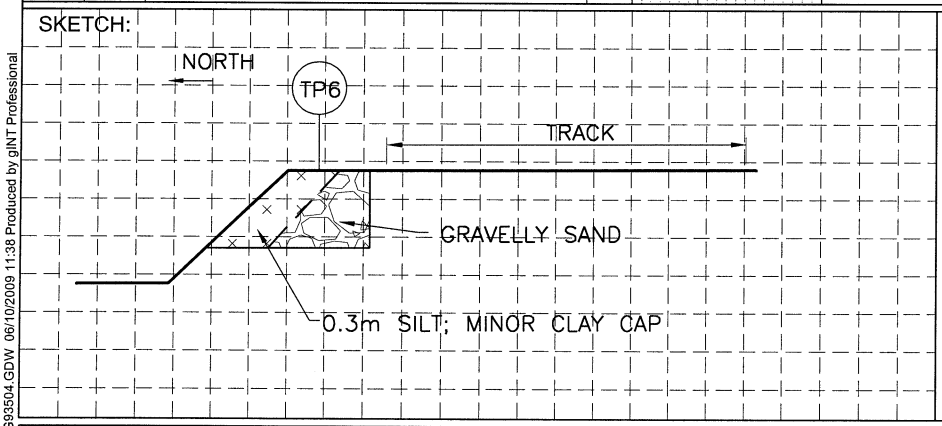
Job No.:	Start Date: 17-09-09 Finish Date:	Ground Level (m):	Co-Ordinates ():
09828			

Client:	Hole Depth:	Sheet:
Good Earth Matters	0.75 m	1 of 1

Elevation (m)	Depth (m)	Geological Description	Legend	Weathering (RS CW HW MW SW UW)	Field Strength (Soil: VS/VL S/M F/MD St/D VSt/VD H/Hd; Rock: EW/VW W/MS S/VS ES)	Defect Description (type, orientation, spacing, roughness, persistence aperture, infilling etc)	Samples	Tests
	0.30	SILT; minor clay, trace to minor sand, minor rounded greywacke gravels						PSD test
	0.75	medium to coarse gravelly SAND; minor cobbles, grey, non plastic, gravels and cobbles are rounded greywacke						No. 1 0, 1, 0, 1, 0, 1, 0, 1, 1, 20
	1	EOH @ 0.75 m						No. 2 1, 1, 1, 1, 20
	2							
	3							
	4							
	5							

Soil Description: subordinate, praticle size, MAJOR, minor; colour, structure; strength; moisture condition; grading; bedding; plasticity; sensitivity; major qualifications; weathering of clasts; subordinate qualifications; minor qualifications; additional structure; (GEOLOGIC UNIT).
Rock Description: weathering; colour; texture; fabric and orientation; NAME; strength; additional description, (GEOLOGIC UNIT).

SKETCH:



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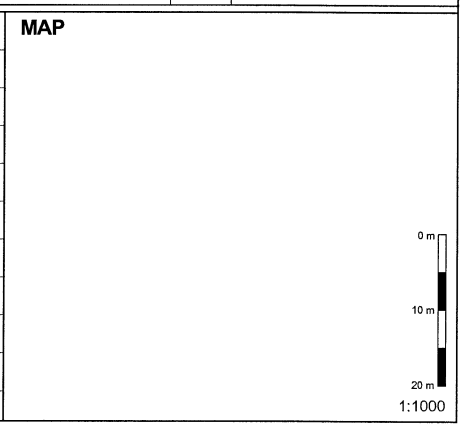
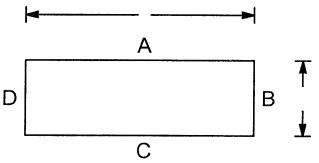


Shoring/Support:
Stability:



- Small Disturbed Sample
- Large Disturbed Sample
- U100 Undisturbed Sample
- Permeability Test
- Schmidt Hammer
- Insitu Vane Shear Strength (kPa) P=Peak, R=Residual, UTP=Unable to penetrate
- Scala Penetrometer - blows/50mm

GROUNDWATER
- [ ] None
- [ ] Slow Seep (depth)
- [ ] Rapid Inflow (depth)

PIT TERMINATED DUE TO:
- [X] Target depth
- [ ] Flooding
- [ ] Refusal
- [ ] Machine limit

Remarks

All dimensions in metres Scale 1:50		Shear Vane No.	Logged by: MJB	Checked by:

RILEYAKL.GLB Log RILEY TP 09828.GPJ DWG93504.GDW 06/10/2009 11:38 Produced by gINT Professional

RILEY CONSULTANTS Engineers and Geologists
Riley Consultants Ltd
4 Fred Thomas Drive
Takapuna, AKL
Tel: 09 4897872
Fax: 09 4897873

TEST PIT LOG

Project:	Location:	Hole position:	No.:
Greymouth Flood	Greymouth	Middle of stopbank track	TP7

Job No.:	Start Date: 17-09-09 Finish Date:	Ground Level (m):	Co-Ordinates ():
09828			

Client:	Hole Depth:	Sheet:
Good Earth Matters	0.85 m	1 of 1

Elevation (m)	Depth (m)	Geological Description	Legend	Weathering	Field Strength	Defect Description	Samples	Tests
		Soil Description: subordinate, praticle size, MAJOR, minor; colour, structure; strength; moisture condition; grading; bedding; plasticity; sensitivity; major qualifications; weathering of clasts; subordinate qualifications; minor qualifications; additional structure; (GEOLOGIC UNIT). Rock Description: weathering; colour; texture; fabric and orientation; NAME; strength; additional description, (GEOLOGIC UNIT).		RS CW HW MW SW UW	Soil: VSVL SIL MD SVD VSt/H VSt/VH Rock: VW MS S VS ES	(type, orientation, spacing, roughness, persistence aperture, infilling etc)		
	0.40	medium to coarse gravelly SAND; minor cobbles, grey, non plastic, gravels and cobbles are rounded greywacke						
	0.65	dark brown topsoil stained layer with trace organic material, i.e wood						PSD test
	0.85	medium to coarse gravelly SAND; minor cobbles, grey, non plastic, gravels and cobbles are rounded greywacke						No. 1 1, 1, 2, 2, 3, 3, 4, 5, 20
	1	EOH @ 0.85 m						
	2							
	3							
	4							
	5							

SKETCH:

MAP

0 m
10 m
20 m
1:1000

Shoring/Support:
Stability:

A
B
C
D

- Small Disturbed Sample
- Large Disturbed Sample
- U100 Undisturbed Sample
- Permeability Test
- Schmidt Hammer
- Insitu Vane Shear Strength (kPa) P=Peak, R=Residual, UTP=Unable to penetrate
- Scala Penetrometer - blows/50mm

GROUNDWATER
- [ ] None
- [ ] Slow Seep (depth)
- [ ] Rapid Inflow (depth)

PIT TERMINATED DUE TO:
- [X] Target depth
- [ ] Flooding
- [ ] Refusal
- [ ] Machine limit

Remarks

All dimensions in metres Scale 1:50		Shear Vane No.	Logged by: MJB	Checked by:

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RILEY CONSULTANTS
Engineers and Geologists
Riley Consultants Ltd
4 Fred Thomas Drive
Takapuna, AKL
Tel: 09 4897872
Fax: 09 4897873

TEST PIT LOG

Project:	Location:	Hole position:	No.:
Greymouth Flood	Greymouth	Mid stopbank track	TP8

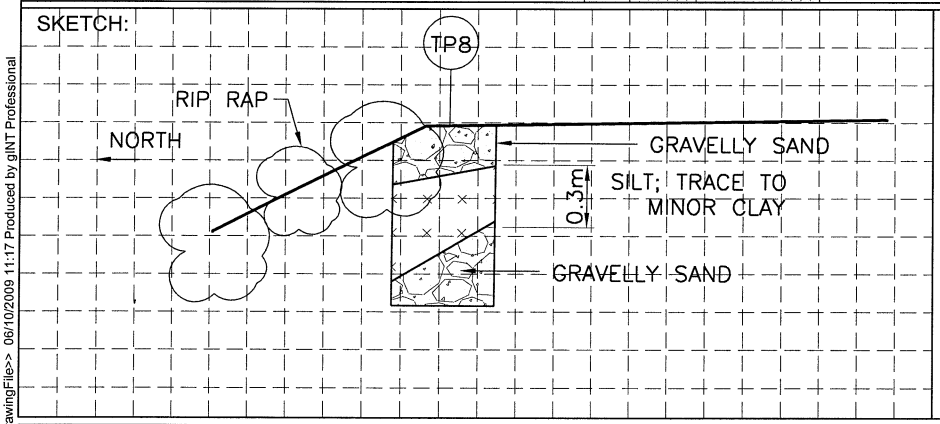
Job No.:	Start Date: 17-09-09 Finish Date:	Ground Level (m):	Co-Ordinates ():
09828			

Client:	Hole Depth:	Sheet:
Good Earth Matters	0.75 m	1 of 1

Elevation (m)	Depth (m)	Geological Description	Legend	Weathering	Field Strength (Soil | Rock)	Defect Description	Samples	Tests
	0.30	medium to coarse gravelly SAND; minor cobbles, grey, non plastic, gravels and cobbles are rounded greywacke						No. 1 1, 3, 3, 10, 20 No. 2 1, 2, 1, 3, 5, 12, 20
	0.60							
	0.75	SILT; trace to minor clay, brownish orange, orange and brownish grey staining						
	1	medium to coarse gravelly SAND; minor cobbles, grey, non plastic, gravels and cobbles are rounded greywacke						
		EOH @ 0.75 m						
	2							
	3							
	4							
	5							

Weathering: RS CW HW MW SW UW
Field Strength (Soil): VS/VL SIL MD SI/D VSI/VD
Field Strength (Rock): VW W MS SS VS ES

SKETCH:



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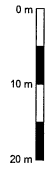

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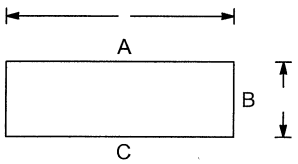
Shoring/Support:
Stability:



- Small Disturbed Sample
- Large Disturbed Sample
- U100 Undisturbed Sample
- Permeability Test
- Schmidt Hammer
- Insitu Vane Shear Strength (kPa) P=Peak, R=Residual, UTP=Unable to penetrate
- Scala Penetrometer - blows/50mm

GROUNDWATER
- [ ] None
- [ ] Slow Seep (depth)
- [ ] Rapid Inflow (depth)

PIT TERMINATED DUE TO:
- [X] Target depth
- [ ] Flooding
- [ ] Refusal
- [ ] Machine limit

Remarks

All dimensions in metres Scale 1:50		Shear Vane No.	Logged by: MJB	Checked by:

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RILEY CONSULTANTS
Engineers and Geologists

Riley Consultants Ltd
4 Fred Thomas Drive
Takapuna, AKL
Tel: 09 4897872
Fax: 09 4897873

TEST PIT LOG

Project:	Location:	Hole position:	No.:
Greymouth Flood	Greymouth	Middle of stopbank track	TP9

Job No.:	Start Date: 17-09-09 Finish Date:	Ground Level (m):	Co-Ordinates ():
09828			

Client:	Hole Depth:	Sheet:
Good Earth Matters	0.90 m	1 of 1

Elevation (m)	Depth (m)	Geological Description	Legend	Weathering	Field Strength (Soil / Rock)	Defect Description	Samples	Tests
	0.30	medium to coarse gravelly SAND; grey, non plastic, gravels are rounded greywacke						
	0.50							
	0.75	medium to coarse gravelly SAND; minor cobbles, grey, non plastic, gravels and cobbles are rounded greywacke						
	0.90							
	1	silty TOPSOIL staining, dark brown						No. 1 1, 4, 3, 2, 3, 3, 7, 5, 20
		pockets of topsoil/silty material, predominantly gravelly sand						
		EOH @ 0.90 m						
	2							
	3							
	4							
	5							

Soil Description: subordinate, praticle size, MAJOR, minor; colour, structure; strength; moisture condition; grading; bedding; plasticity; sensitivity; major qualifications; weathering of clasts; subordinate qualifications; minor qualifications; additional structure; (GEOLOGIC UNIT).
Rock Description: weathering; colour; texture; fabric and orientation; NAME; strength; additional description, (GEOLOGIC UNIT).

Weathering: RS, CW, HW, MW, SW, UW
Field Strength (Soil): VS/VL, S/L, M/D, S/D, VS/VD, H/VD
Field Strength (Rock): H/W, M/W, W, M/S, S/S, V/S, E/S

SKETCH:

MAP

0 m
10 m
20 m
1:1000

Shoring/Support:
Stability:

A
B
C
D

- Small Disturbed Sample
- Large Disturbed Sample
- U100 Undisturbed Sample
- Permeability Test
- Schmidt Hammer
- Insitu Vane Shear Strength (kPa) P=Peak, R=Residual, UTP=Unable to penetrate
- Scala Penetrometer - blows/50mm

GROUNDWATER
- [ ] None
- [ ] Slow Seep (depth)
- [ ] Rapid Inflow (depth)

PIT TERMINATED DUE TO:
- [X] Target depth
- [ ] Flooding
- [ ] Refusal
- [ ] Machine limit

Remarks

All dimensions in metres Scale 1:50		Shear Vane No.	Logged by: MJB	Checked by:

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Engineers and Geologists

Riley Consultants Ltd
4 Fred Thomas Drive
Takapuna, AKL
Tel: 09 4897872
Fax: 09 4897873

TEST PIT LOG

Project:	Location:	Hole position:	No.:
Greymouth Flood	Greymouth	Above concrete stopbank wall	TP10

Job No.:	Start Date: 17-09-09 Finish Date:	Ground Level (m):	Co-Ordinates ():
09828			

Client:	Hole Depth:	Sheet:
Good Earth Matters	0.90 m	1 of 1

Elevation (m)	Depth (m)	Geological Description	Legend	Weathering	Field Strength (Soil / Rock)	Defect Description	Samples	Tests
	0.35	medium to coarse gravelly SAND; minor cobbles, grey, non plastic, gravels and cobbles are rounded greywacke						
	0.90	SILT; minor clay, minor sand, dark brown topsoil staining						PSD test Proctor test
	1	EOH @ 0.90 m						
	2							
	3							
	4							
	5							

Soil Description: subordinate, praticle size, MAJOR, minor; colour, structure; strength; moisture condition; grading; bedding; plasticity; sensitivity; major qualifications; weathering of clasts; subordinate qualifications; minor qualifications; additional structure; (GEOLOGIC UNIT).
Rock Description: weathering; colour; texture; fabric and orientation; NAME; strength; additional description, (GEOLOGIC UNIT).

Weathering: RS CW HW MW SW UW
Field Strength: VS/VL F/MD St/D V/St/D H/EW VW Ws S/s Vs Es
Defect Description: (type, orientation, spacing, roughness, persistence aperture, infilling etc)

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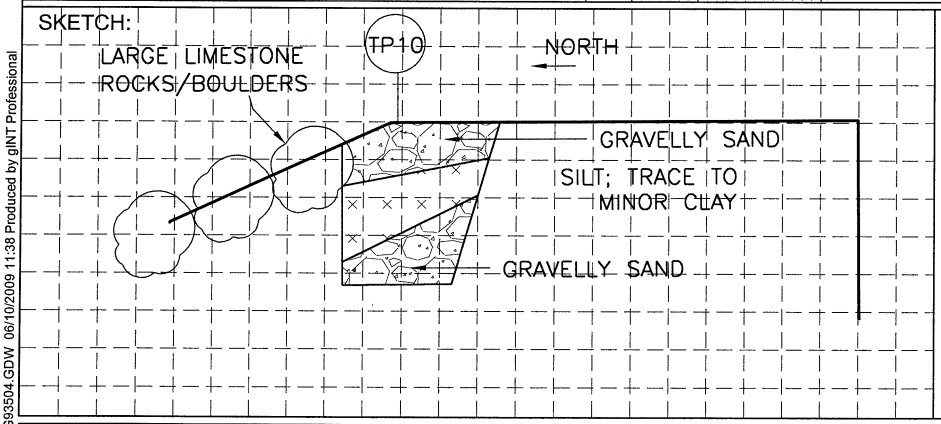
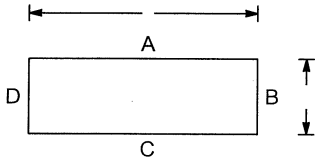


MAP

1:1000

Shoring/Support:
Stability:



- Small Disturbed Sample
- Large Disturbed Sample
- U100 Undisturbed Sample
- Permeability Test
- Schmidt Hammer
- Insitu Vane Shear Strength (kPa) P=Peak, R=Residual, UTP=Unable to penetrate
- Scala Penetrometer - blows/50mm

GROUNDWATER
- [ ] None
- [ ] Slow Seep (depth)
- [ ] Rapid Inflow (depth)

PIT TERMINATED DUE TO:
- [X] Target depth
- [ ] Flooding
- [ ] Refusal
- [ ] Machine limit

Remarks

All dimensions in metres Scale 1:50		Shear Vane No.	Logged by: MJB	Checked by:

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RILEY CONSULTANTS
Engineers and Geologists

Riley Consultants Ltd
4 Fred Thomas Drive
Takapuna, AKL
Tel: 09 4897872
Fax: 09 4897873

TEST PIT LOG

Project: Greymouth Flood	Location: Greymouth	Hole position: Middle of stopbank track	No.: TP11
Job No.: 09828	Start Date: 18-09-09 Finish Date:	Ground Level (m):	Co-Ordinates ():
Client: Good Earth Matters	Hole Depth: 0.55 m		Sheet: 1 of 1

Elevation (m)	Depth (m)	Geological Description	Legend	Weathering	Field Strength	Defect Description	Samples	Tests
	0.20	medium to coarse gravelly SAND; minor cobbles, grey, non plastic, gravels and cobbles are rounded greywacke						
	0.55	dark brown staining, trace silt						No. 1 1, 1, 2, 4, 3, 4, 10, 5, 10, 10, 10
	1	EOH @ 0.55 m						
	2							
	3							
	4							
	5							

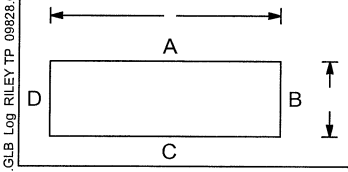
Soil Description: subordinate, praticle size, MAJOR, minor; colour, structure; strength; moisture condition; grading; bedding; plasticity; sensitivity; major qualifications; weathering of clasts; subordinate qualifications; minor qualifications; additional structure; (GEOLOGIC UNIT).
Rock Description: weathering; colour; texture; fabric and orientation; NAME; strength; additional description, (GEOLOGIC UNIT).

Weathering: RS CW HW MW SW UW
Field Strength: Soil VS/VL SL/LO F/MD S/D VS/VD — Rock VW W MS S VS ES
Defect Description: (type, orientation, spacing, roughness, persistence aperture, infilling etc)

SKETCH:

MAP
0 m
10 m
20 m
1:1000

Shoring/Support:
Stability:



- Small Disturbed Sample
- Large Disturbed Sample
- U100 Undisturbed Sample
- Permeability Test
- Schmidt Hammer
- Insitu Vane Shear Strength (kPa) P=Peak, R=Residual, UTP=Unable to penetrate
- Scala Penetrometer - blows/50mm

GROUNDWATER ☐ None
☐ Slow Seep (depth)
☐ Rapid Inflow (depth)

PIT TERMINATED DUE TO:
☒ Target depth ☐ Flooding
☐ Refusal ☐ Machine limit

Remarks

All dimensions in metres Scale 1:50		Shear Vane No.	Logged by: MJB	Checked by:

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Riley Consultants Ltd
4 Fred Thomas Drive
Takapuna, AKL
Tel: 09 4897872
Fax: 09 4897873

TEST PIT LOG

Project:	Location:	Hole position:	No.:
Greymouth Flood	Greymouth		TP12

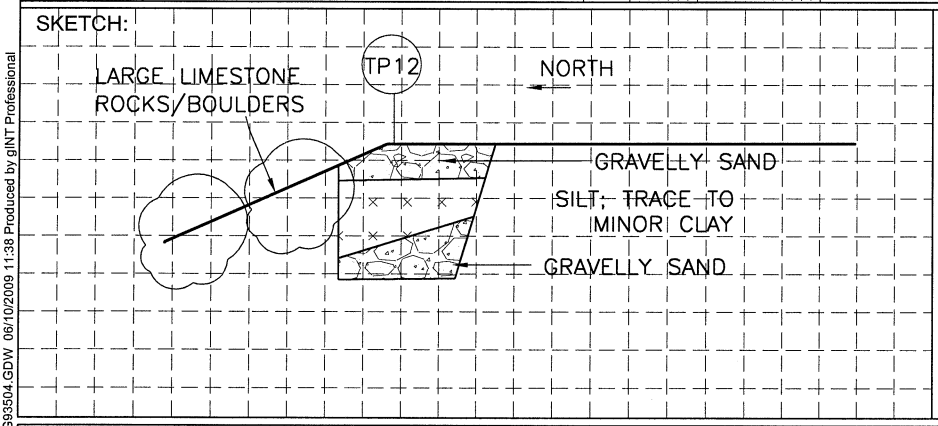
Job No.:	Start Date: / Finish Date:	Ground Level (m):	Co-Ordinates ():
09828	18-09-09		

Client:	Hole Depth:	Sheet:
Good Earth Matters	0.65 m	1 of 1

Elevation (m)	Depth (m)	Geological Description	Legend	Weathering	Field Strength (Soil — Rock)	Defect Description (type, orientation, spacing, roughness, persistence aperture, infilling etc)	Samples	Tests
	0.10	medium to coarse gravelly SAND; minor cobbles, grey, non plastic, gravels and cobbles are rounded greywacke						No. 1 1, 2, 2, 2, 2, 2, 7, 20 PSD test
	0.50							
	0.65	SILT; trace to minor clay, trace to minor rounded greywacke gravels and angular limestone gravels-boulders, grey, non plastic						No. 2 1, 1, 2, 3, 3, 4, 10, 6, 11, 8, 8, 8, 6, 5, 4, 9, 5, 3, 3, 4
	1	medium to coarse gravelly SAND; minor cobbles, grey, non plastic, gravels and cobbles are rounded greywacke						
		EOH @ 0.65 m						
	2							
	3							
	4							
	5							

Weathering: RS, CW, HW, MW, SW, UW
Field Strength: Soil — VS/VL, S/MD, F/MD, S/VD, VS/VD, VW, W/S, S/VS, ES

SKETCH:



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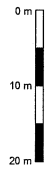
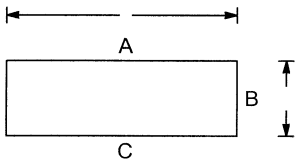


1:1000

Shoring/Support:
Stability:



- Small Disturbed Sample
- Large Disturbed Sample
- U100 Undisturbed Sample
- Permeability Test
- Schmidt Hammer
- Insitu Vane Shear Strength (kPa) P=Peak, R=Residual, UTP=Unable to penetrate
- Scala Penetrometer - blows/50mm

GROUNDWATER
- [ ] None
- [ ] Slow Seep (depth)
- [ ] Rapid Inflow (depth)

PIT TERMINATED DUE TO:
- [X] Target depth
- [ ] Flooding
- [ ] Refusal
- [ ] Machine limit

Remarks

All dimensions in metres Scale 1:50		Shear Vane No.	Logged by: MJB	Checked by:

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RILEY CONSULTANTS Engineers and Geologists
Riley Consultants Ltd
4 Fred Thomas Drive
Takapuna, AKL
Tel: 09 4897872
Fax: 09 4897873

TEST PIT LOG

Project:	Location:	Hole position:	No.:
Greymouth Flood	Greymouth	Between two bridges	TP13

Job No.:	Start Date: / Finish Date:	Ground Level (m):	Co-Ordinates ():
09828	18-09-09		

Client:	Hole Depth:	Sheet:
Good Earth Matters	3.70 m	1 of 1

Elevation (m)	Depth (m)	Geological Description	Legend	Weathering	Field Strength	Defect Description	Samples	Tests
	0.80	[FILL] medium to coarse gravelly SAND; minor cobbles, grey, non plastic, gravels and cobbles are rounded greywacke, root and organic debris inclusions.						No. 1 1, 1, 1, 1, 1, 1, 1, 1, 6, 3, 2, 2, 3, 3, 1, 2, 2, 2, 2
	1 1.50	medium to coarse silty gravelly SAND; minor cobbles, grey, non plastic, gravels and cobbles are rounded greywacke, black carbonaceous organic inclusions						PSD test
	2 2.50	organic content, reducing with depth, occasional brick and steel inclusions						
	3 3.30	very large wood fragments inclusions(up to 600mm across), steel and brick inclusions						
	3.70	large angular limestone BOULDERS						
	4 5	to hard to dig due to large limestone boulders/bedrock EOH @ 3.70 m						

Weathering: RS, CW, MW, SW, UW
Field Strength: Soil — VS/VL, S/L, F/M, St/D, VSt/VD, H/VH; Rock — W, Ws, S/VS, E/S
Samples

SKETCH:

MAP

0 m
10 m
20 m
1:1000

Shoring/Support:
Stability:

A
B
C
D

- Small Disturbed Sample
- Large Disturbed Sample
- U100 Undisturbed Sample
- Permeability Test
- Schmidt Hammer
- Insitu Vane Shear Strength (kPa) P=Peak, R=Residual, UTP=Unable to penetrate
- Scala Penetrometer - blows/50mm

GROUNDWATER
- [ ] None
- [ ] Slow Seep (depth)
- [ ] Rapid Inflow (depth)

PIT TERMINATED DUE TO:
- [X] Target depth
- [ ] Flooding
- [ ] Refusal
- [ ] Machine limit

Remarks

All dimensions in metres Scale 1:50		Shear Vane No.	Logged by: MJB	Checked by:

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RILEY CONSULTANTS Engineers and Geologists
Riley Consultants Ltd
4 Fred Thomas Drive
Takapuna, AKL
Tel: 09 4897872
Fax: 09 4897873

TEST PIT LOG

Project:	Location:	Hole position:	No.:
Greymouth Flood	Greymouth	Between two bridges	TP14

Job No.:	Start Date: / Finish Date:	Ground Level (m):	Co-Ordinates ():
09828			

Client:	Hole Depth:	Sheet:
Good Earth Matters	3.00 m	1 of 1

Elevation (m)	Depth (m)	Geological Description	Legend	Weathering (RS, CW, HW, MW, SW, UW)	Field Strength (Soil: VS/VL, S/L, S/MD, S/D, VS/VD, L/MD, L/VD, VW; Rock: W, MS, S, VS, ES)	Defect Description (type, orientation, spacing, roughness, persistence aperture, infilling etc)	Samples	Tests
	1	[FILL] medium to coarse gravelly SAND; minor cobbles, grey, non plastic, gravels and cobbles are rounded greywacke						
	1.30							
	1.50	silty gravelly SAND; dark brown, organic pockets, trace wood and inorganic debris						
	2							
	2.00	angular limestone boulders inclusions						
		medium to coarse gravelly SAND; minor cobbles, grey, non plastic, gravels and cobbles are rounded greywacke, angular limestone boulders						
	3							
	3.00	EOH @ 3.00 m						
	4							
	5							

SKETCH:

MAP

0 m
10 m
20 m
1:1000

Shoring/Support:
Stability:

A
B
C
D

- Small Disturbed Sample
- Large Disturbed Sample
- U100 Undisturbed Sample
- Permeability Test
- Schmidt Hammer
- Insitu Vane Shear Strength (kPa) P=Peak, R=Residual, UTP=Unable to penetrate
- Scala Penetrometer - blows/50mm

GROUNDWATER
- [ ] None
- [ ] Slow Seep (depth)
- [ ] Rapid Inflow (depth)

PIT TERMINATED DUE TO:
- [X] Target depth
- [ ] Flooding
- [ ] Refusal
- [ ] Machine limit

Remarks

All dimensions in metres Scale 1:50		Shear Vane No.	Logged by: MJB	Checked by:

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Riley Consultants Ltd
4 Fred Thomas Drive
Takapuna, AKL
Tel: 09 4897872
Fax: 09 4897873

TEST PIT LOG

Project:	Location:	Hole position:	No.:
Greymouth Flood	Greymouth	Between two bridges	TP15

Job No.:	Start Date: / Finish Date:	Ground Level (m):	Co-Ordinates ():
09828	18-09-09		

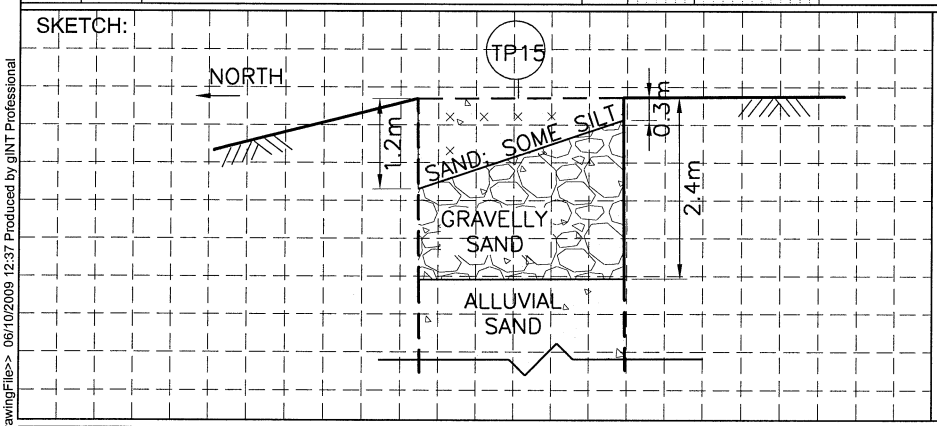
Client:	Hole Depth:	Sheet:
Good Earth Matters	5.00 m	1 of 1

Elevation (m)	Depth (m)	Geological Description	Legend	Weathering	Field Strength (Soil / Rock)	Defect Description	Samples	Tests
	1	[FILL] SAND; some silt and rounded greywacke gravels, brown, non plastic rootlets						
	1.20							
	2	gravelly SAND; trace silt, minor cobbles, gravels and cobbles are well graded, rounded greywacke, aungular limestone boulder inclusions, occasional silty band/pocket						
	2.40							
	3	medium grained SAND; grey, occasional tree/wood inclusions						
	3.50							
	3.70	seepage						
	4							
	5	EOH @ 5.00 m						

Soil Description: subordinate, praticle size, MAJOR, minor; colour, structure; strength; moisture condition; grading; bedding; plasticity; sensitivity; major qualifications; weathering of clasts; subordinate qualifications; minor qualifications; additional structure; (GEOLOGIC UNIT).
Rock Description: weathering; colour; texture; fabric and orientation; NAME; strength; additional description, (GEOLOGIC UNIT).

Weathering: RS CW MW SW UW
Field Strength: VS/VL S/MD St/D VSt/VD VW W MS S VS ES
Defect Description: (type, orientation, spacing, roughness, persistence aperture, infilling etc)

SKETCH:



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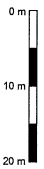

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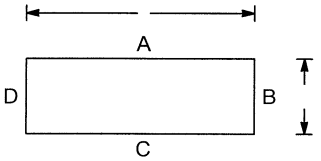
Shoring/Support:
Stability:



- Small Disturbed Sample
- Large Disturbed Sample
- U100 Undisturbed Sample
- Permeability Test
- Schmidt Hammer
- Insitu Vane Shear Strength (kPa)
  P=Peak, R=Residual,
  UTP=Unable to penetrate
- Scala Penetrometer - blows/50mm

GROUNDWATER ☐ None
☐ Slow Seep (depth)
☐ Rapid Inflow (depth)

PIT TERMINATED DUE TO:
☒ Target depth ☐ Flooding
☐ Refusal ☐ Machine limit

Remarks

All dimensions in metres Scale 1:50		Shear Vane No.	Logged by: MJB	Checked by:

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RILEY CONSULTANTS Engineers and Geologists
Riley Consultants Ltd
4 Fred Thomas Drive
Takapuna, AKL
Tel: 09 4897872
Fax: 09 4897873

TEST PIT LOG

Project:	Location:	Hole position:	No.:
Greymouth Flood	Greymouth	Between two bridges	TP16

Job No.:	Start Date: 21-09-09 Finish Date:	Ground Level (m):	Co-Ordinates ():
09828			

Client:	Hole Depth:	Sheet:
Good Earth Matters	3.80 m	1 of 1

Elevation (m)	Depth (m)	Geological Description	Legend	Weathering	Field Strength	Defect Description	Samples	Tests
	0.50	[FILL] medium to coarse gravelly SAND; minor cobbles, grey, non plastic, gravels and cobbles are rounded greywacke						
	2.50	trace large subangular limestone boulders inclusions, up to 1m in diameter, occasional wood inclusions						
	3.60	sandy SILT; fine gravels, minor rounded gravels, brown, non plastic						
	3.80	medium grained SAND; grey, non plastic 3.60 m seepage						
		EOH @ 3.80 m						

Soil Description: subordinate, praticle size, MAJOR, minor; colour, structure; strength; moisture condition; grading; bedding; plasticity; sensitivity; major qualifications; weathering of clasts; subordinate qualifications; minor qualifications; additional structure; (GEOLOGIC UNIT).
Rock Description: weathering; colour; texture; fabric and orientation; NAME; strength; additional description, (GEOLOGIC UNIT).

Weathering: RS CW HW MW SW UW
Field Strength: Soil — Rock: VS/VL SL/LO S/MD S/VD VS/VD VW/W W MS S VS ES
Defect Description: (type, orientation, spacing, roughness, persistence aperture, infilling etc)

SKETCH:

MAP
0 m
10 m
20 m
1:1000

Shoring/Support:
Stability:

A
B
C
D

- Small Disturbed Sample
- Large Disturbed Sample
- U100 Undisturbed Sample
- Permeability Test
- Schmidt Hammer
- Insitu Vane Shear Strength (kPa) P=Peak, R=Residual, UTP=Unable to penetrate
- Scala Penetrometer - blows/50mm

GROUNDWATER
- [ ] None
- [ ] Slow Seep (depth)
- [ ] Rapid Inflow (depth)

PIT TERMINATED DUE TO:
- [X] Target depth
- [ ] Flooding
- [ ] Refusal
- [ ] Machine limit

Remarks

All dimensions in metres Scale 1:50		Shear Vane No.	Logged by: MJB	Checked by:

RILEYAKL.GLB Log RILEY TP 09828.GPJ <<DrawingFile>> 06/10/2009 12:37 Produced by gINT Professional

RILEY CONSULTANTS
Engineers and Geologists
Riley Consultants Ltd
4 Fred Thomas Drive
Takapuna, AKL
Tel: 09 4897872
Fax: 09 4897873

TEST PIT LOG

Project:	Location:	Hole position:	No.:
Greymouth Flood	Greymouth	Adjacent sportsclub	TP17

Job No.:	Start Date: 21-09-09 Finish Date:	Ground Level (m):	Co-Ordinates ():
09828			

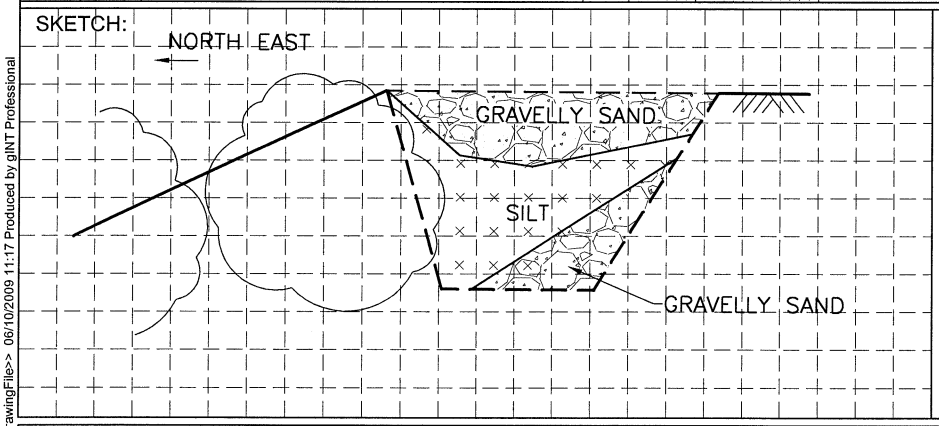
Client:	Hole Depth:	Sheet:
Good Earth Matters	0.60 m	1 of 1

Elevation (m)	Depth (m)	Geological Description	Legend	Weathering	Field Strength (Soil | Rock)	Defect Description (type, orientation, spacing, roughness, persistence aperture, infilling etc)	Samples	Tests
	0.20	medium to coarse gravelly SAND; minor cobbles, grey, non plastic, gravels and cobbles are rounded greywacke						
	0.45							
	0.60	SILT; some limestone gravels, light orange/brown, non plastic						
	1	medium to coarse gravelly SAND; minor cobbles, grey, non plastic, gravels and cobbles are rounded greywacke						
		EOH @ 0.60 m						
	2							
	3							
	4							
	5							

Soil Description: subordinate, praticle size, MAJOR, minor; colour, structure; strength; moisture condition; grading; bedding; plasticity; sensitivity; major qualifications; weathering of clasts; subordinate qualifications; minor qualifications; additional structure; (GEOLOGIC UNIT).
Rock Description: weathering; colour; texture; fabric and orientation; NAME; strength; additional description, (GEOLOGIC UNIT).

Weathering: RS CW HW MW SW UW
Field Strength: VS/VL SI/L MD SI/D VS/VD VW W Ws S VS ES

SKETCH:



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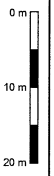

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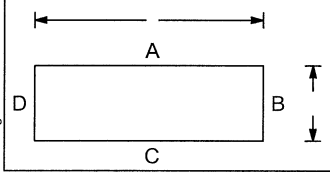
Shoring/Support:
Stability:



- Small Disturbed Sample
- Large Disturbed Sample
- U100 Undisturbed Sample
- Permeability Test
- Schmidt Hammer
- Insitu Vane Shear Strength (kPa) P=Peak, R=Residual, UTP=Unable to penetrate
- Scala Penetrometer - blows/50mm

GROUNDWATER
- [ ] None
- [ ] Slow Seep (depth)
- [ ] Rapid Inflow (depth)

PIT TERMINATED DUE TO:
- [X] Target depth
- [ ] Flooding
- [ ] Refusal
- [ ] Machine limit

Remarks

All dimensions in metres Scale 1:50		Shear Vane No.	Logged by: MJB	Checked by:

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RILEY CONSULTANTS Engineers and Geologists
Riley Consultants Ltd
4 Fred Thomas Drive
Takapuna, AKL
Tel: 09 4897872
Fax: 09 4897873

TEST PIT LOG

Project:	Location:	Hole position:	No.:
Greymouth Flood	Greymouth	East of sports club	TP18

Job No.:	Start Date: 21-09-09 Finish Date:	Ground Level (m):	Co-Ordinates ():
09828			

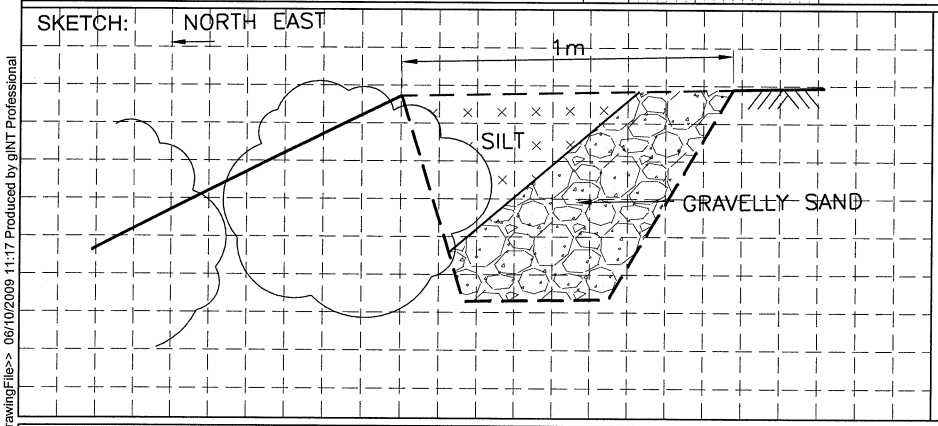
Client:	Hole Depth:	Sheet:
Good Earth Matters	0.65 m	1 of 1

Elevation (m)	Depth (m)	Geological Description	Legend	Weathering	Field Strength (Soil | Rock)	Defect Description	Samples	Tests
	0.50	limestone boulders generally <400mm in diameter with SILT; trace fine gravels, trace sand, minor clay, predominantly orange/brown void infill						
	0.65	medium to coarse gravelly SAND; minor cobbles, grey, non plastic, gravels and cobbles are rounded greywacke						
	1	EOH @ 0.65 m						
	2							
	3							
	4							
	5							

Soil Description: subordinate, praticle size, MAJOR, minor; colour, structure; strength; moisture condition; grading; bedding; plasticity; sensitivity; major qualifications; weathering of clasts; subordinate qualifications; minor qualifications; additional structure; (GEOLOGIC UNIT).
Rock Description: weathering; colour; texture; fabric and orientation; NAME; strength; additional description, (GEOLOGIC UNIT).

Weathering: RS CW HW MW SW UW
Soil: VS/VL SL F/MD S/VD
Rock: EW HW MW MS VS ES

SKETCH: NORTH EAST



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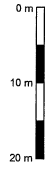

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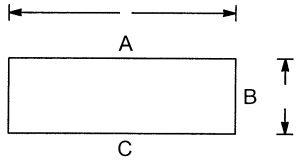
Shoring/Support:
Stability:



- Small Disturbed Sample
- Large Disturbed Sample
- U100 Undisturbed Sample
- Permeability Test
- Schmidt Hammer
- Insitu Vane Shear Strength (kPa) P=Peak, R=Residual, UTP=Unable to penetrate
- Scala Penetrometer - blows/50mm

GROUNDWATER
- [ ] None
- [ ] Slow Seep (depth)
- [ ] Rapid Inflow (depth)

PIT TERMINATED DUE TO:
- [X] Target depth
- [ ] Flooding
- [ ] Refusal
- [ ] Machine limit

Remarks

All dimensions in metres Scale 1:50		Shear Vane No.	Logged by: MJB	Checked by:

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RILEY CONSULTANTS
Engineers and Geologists

Riley Consultants Ltd
4 Fred Thomas Drive
Takapuna, AKL
Tel: 09 4897872
Fax: 09 4897873

TEST PIT LOG

Project:	Location:	Hole position:	No.:
Greymouth Flood	Greymouth	North fishermans wharf	TP19

Job No.:	Start Date: 21-09-09 Finish Date:	Ground Level (m):	Co-Ordinates ():
09828			

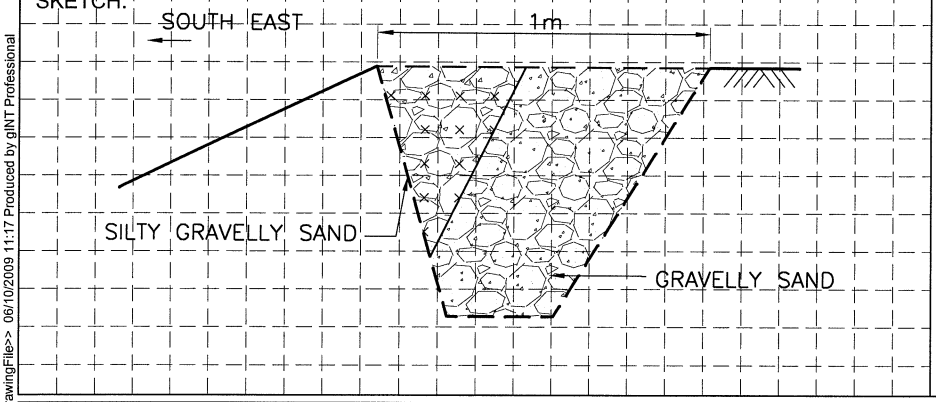
Client:	Hole Depth:	Sheet:
Good Earth Matters	0.55 m	1 of 1

Elevation (m)	Depth (m)	Geological Description	Legend	Weathering	Field Strength (Soil | Rock)	Defect Description	Samples	Tests
	0.40	medium to coarse silty gravelly SAND; minor cobbles, grey, non plastic, gravels and cobbles are rounded greywacke						
	0.55	medium to coarse gravelly SAND; minor cobbles, grey, non plastic, gravels and cobbles are rounded greywacke						
	1	EOH @ 0.55 m						
	2							
	3							
	4							
	5							

Soil Description: subordinate, praticle size, MAJOR, minor; colour, structure; strength; moisture condition; grading; bedding; plasticity; sensitivity; major qualifications; weathering of clasts; subordinate qualifications; minor qualifications; additional structure; (GEOLOGIC UNIT).
Rock Description: weathering; colour; texture; fabric and orientation; NAME; strength; additional description, (GEOLOGIC UNIT).

Weathering: RS CW HW MW SW UW
Field Strength (Soil): VS/VL SL FI MD SD VS/VD
Field Strength (Rock): EW VW W MS SS VS ES

SKETCH:



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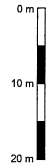

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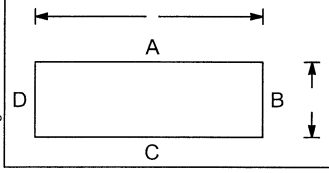
Shoring/Support:
Stability:



- Small Disturbed Sample
- Large Disturbed Sample
- U100 Undisturbed Sample
- Permeability Test
- Schmidt Hammer
- Insitu Vane Shear Strength (kPa) P=Peak, R=Residual, UTP=Unable to penetrate
- Scala Penetrometer - blows/50mm

GROUNDWATER
- [ ] None
- [ ] Slow Seep (depth)
- [ ] Rapid Inflow (depth)

PIT TERMINATED DUE TO:
- [X] Target depth
- [ ] Flooding
- [ ] Refusal
- [ ] Machine limit

Remarks

All dimensions in metres Scale 1:50		Shear Vane No.	Logged by: MJB	Checked by:

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RILEY CONSULTANTS Engineers and Geologists
Riley Consultants Ltd
4 Fred Thomas Drive
Takapuna, AKL
Tel: 09 4897872
Fax: 09 4897873

TEST PIT LOG

Project:	Location:	Hole position:	No.:
Greymouth Flood	Greymouth	Above Fishermans wharf	TP20

Job No.:	Start Date: / Finish Date:	Ground Level (m):	Co-Ordinates ():
09828			

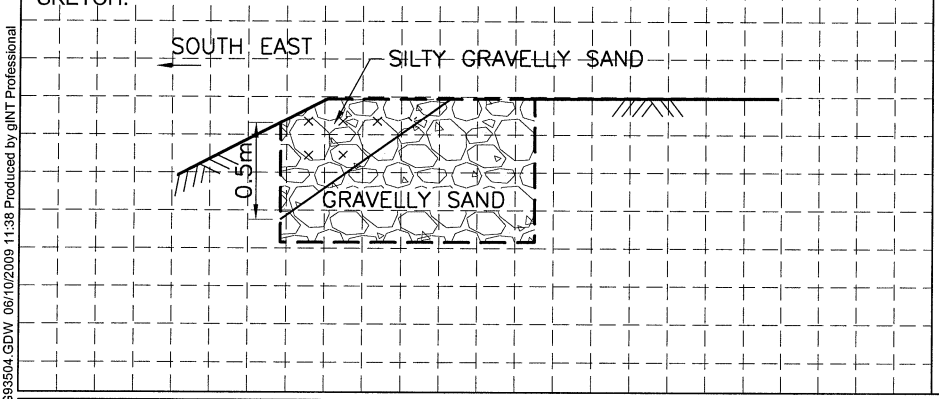
Client:	Hole Depth:	Sheet:
Good Earth Matters	0.70 m	1 of 1

Elevation (m)	Depth (m)	Geological Description	Legend	Weathering	Field Strength	Defect Description	Samples	Tests
	0.50	(Topsoil) gravelly silty SAND; rounded greywacke gravels generally minor rounded graywacke cobble, dark brown, non plastic						
	0.70	gravelly SAND; rounded greywacke gravels generally, minor rounded greywacke cobbles, medium grey, non plastic						PSD test
	1	EOH @ 0.70 m						
	2							
	3							
	4							
	5							

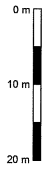
Soil Description: subordinate, praticle size, MAJOR, minor; colour, structure; strength; moisture condition; grading; bedding; plasticity; sensitivity; major qualifications; weathering of clasts; subordinate qualifications; minor qualifications; additional structure; (GEOLOGIC UNIT).
Rock Description: weathering; colour; texture; fabric and orientation; NAME; strength; additional description, (GEOLOGIC UNIT).

Weathering: RS, CW, HW, MW, SW, UW
Field Strength — Soil: VS/VL, S/L, M/D, S/F/D, VS/F/D, VS/F/V, F/V; Rock: VW, WS, S/S, V/S, E/S
Defect Description: (type, orientation, spacing, roughness, persistence aperture, infilling etc)

SKETCH:

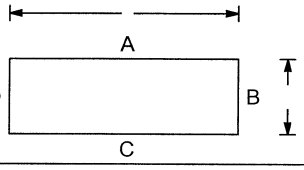


MAP



1:1000

Shoring/Support:
Stability:



- Small Disturbed Sample
- Large Disturbed Sample
- U100 Undisturbed Sample
- Permeability Test
- Schmidt Hammer
- Insitu Vane Shear Strength (kPa) P=Peak, R=Residual, UTP=Unable to penetrate
- Scala Penetrometer - blows/50mm

GROUNDWATER ☐ None
☐ Slow Seep (depth)
☐ Rapid Inflow (depth)

PIT TERMINATED DUE TO:
☒ Target depth ☐ Flooding
☐ Refusal ☐ Machine limit

Remarks

All dimensions in metres Scale 1:50		Shear Vane No.	Logged by: MJB	Checked by:

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RILEY CONSULTANTS
Engineers and Geologists

Riley Consultants Ltd
4 Fred Thomas Drive
Takapuna, AKL
Tel: 09 4897872
Fax: 09 4897873

TEST PIT LOG

Project:	Location:	Hole position:	No.:
Greymouth Flood	Greymouth	Crest of stopbank	TP21

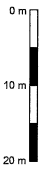
Job No.:	Start Date: / Finish Date:	Ground Level (m):	Co-Ordinates ():
09828	21-09-09		

Client:	Hole Depth:	Sheet:
Good Earth Matters	0.80 m	1 of 1

Elevation (m)	Depth (m)	Geological Description	Legend	Weathering	Field Strength	Defect Description	Samples	Tests
		Soil Description: subordinate, praticle size, MAJOR, minor; colour, structure; strength; moisture condition; grading; bedding; plasticity; sensitivity; major qualifications; weathering of clasts; subordinate qualifications; minor qualifications; additional structure; (GEOLOGIC UNIT). Rock Description: weathering; colour; texture; fabric and orientation; NAME; strength; additional description, (GEOLOGIC UNIT).		RS CW HW MW SW DW	Soil: VS/VL SL/L MD S/VD VS/VD F/VD VW W MS S VS ES — Rock	(type, orientation, spacing, roughness, persistence aperture, infilling etc)		
	0.30	(Topsoil) gravelly silty SAND; rounded greywacke gravels generally minor rounded graywacke cobble, dark brown, non plastic, rootlets.						
	0.80	medium to coarse gravelly SAND; minor cobbles, grey, non plastic, gravels and cobbles are rounded greywacke						
	1	EOH @ 0.80 m						
	2							
	3							
	4							
	5							

SKETCH:

MAP



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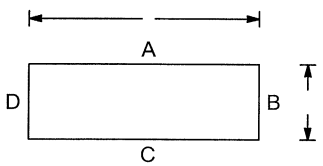
Shoring/Support:
Stability:



- Small Disturbed Sample
- Large Disturbed Sample
- U100 Undisturbed Sample
- Permeability Test
- Schmidt Hammer
- Insitu Vane Shear Strength (kPa) P=Peak, R=Residual, UTP=Unable to penetrate
- Scala Penetrometer - blows/50mm

GROUNDWATER
- [ ] None
- [ ] Slow Seep (depth)
- [ ] Rapid Inflow (depth)

PIT TERMINATED DUE TO:
- [X] Target depth
- [ ] Flooding
- [ ] Refusal
- [ ] Machine limit

Remarks

All dimensions in metres Scale 1:50		Shear Vane No.	Logged by: MJB	Checked by:

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RILEY CONSULTANTS
Engineers and Geologists

Riley Consultants Ltd
4 Fred Thomas Drive
Takapuna, AKL
Tel: 09 4897872
Fax: 09 4897873

TEST PIT LOG

Project:	Location:	Hole position:	No.:
Greymouth Flood	Greymouth	Adjacent culvert	TP22

Job No.:	Start Date: / Finish Date:	Ground Level (m):	Co-Ordinates ():
09828	22-09-09		

Client:	Hole Depth:	Sheet:
Good Earth Matters	1.80 m	1 of 1

Elevation (m)	Depth (m)	Geological Description	Legend	Weathering	Field Strength (Soil / Rock)	Defect Description (type, orientation, spacing, roughness, persistence aperture, infilling etc)	Samples	Tests
	0.25	gravelly SAND; minor silt(topsoil), rounded greywacke gravels generally <30mm in diameter, dark brown, non plastic, rootlets						
	1.10	SILT; minor clay, minor rounded greywacke gravels, trace to minor sand, light grey and orange, non plastic, trace to minor roots, occasional inorganic debris						PSD test
	1.80	large limestone BOULDERS, occasional large concrete block, approximately 1.0m						
	2	EOH @ 1.80 m						
	3							
	4							
	5							

Soil Description: subordinate, praticle size, MAJOR, minor; colour, structure; strength; moisture condition; grading; bedding; plasticity; sensitivity; major qualifications; weathering of clasts; subordinate qualifications; minor qualifications; additional structure; (GEOLOGIC UNIT).
Rock Description: weathering; colour; texture; fabric and orientation; NAME; strength; additional description, (GEOLOGIC UNIT).

Weathering: RS CW HW MW SW UW
Field Strength: VS/VL SI/L MD SI/D SD VS/VD HD W MW MS S VS ES

SKETCH:

MAP
0 m
10 m
20 m
1:1000

Shoring/Support:
Stability:

A
B
C
D

- Small Disturbed Sample
- Large Disturbed Sample
- U100 Undisturbed Sample
- Permeability Test
- Schmidt Hammer
- Insitu Vane Shear Strength (kPa) P=Peak, R=Residual, UTP=Unable to penetrate
- Scala Penetrometer - blows/50mm

GROUNDWATER
- [ ] None
- [ ] Slow Seep (depth)
- [ ] Rapid Inflow (depth)

PIT TERMINATED DUE TO:
- [X] Target depth
- [ ] Flooding
- [ ] Refusal
- [ ] Machine limit

Remarks

All dimensions in metres Scale 1:50		Shear Vane No.	Logged by: MJB	Checked by:

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RILEY CONSULTANTS Engineers and Geologists
Riley Consultants Ltd
4 Fred Thomas Drive
Takapuna, AKL
Tel: 09 4897872
Fax: 09 4897873

TEST PIT LOG

Project:	Location:	Hole position:	No.:
Greymouth Flood	Greymouth	Crest of stopbank	TP23a

Job No.:	Start Date: 22-09-09 Finish Date:	Ground Level (m):	Co-Ordinates ():
09828			

Client:	Hole Depth:	Sheet:
Good Earth Matters	0.60 m	1 of 1

Elevation (m)	Depth (m)	Geological Description	Legend	Weathering	Field Strength	Defect Description	Samples	Tests
	0.60	SILT; trace clay, trace sand, minor to some rounded greywacke gravels, light brown/grey and orange, rootlets						
	1	EOH @ 0.60 m						
	2							
	3							
	4							
	5							

Soil Description: subordinate, praticle size, MAJOR, minor; colour, structure; strength; moisture condition; grading; bedding; plasticity; sensitivity; major qualifications; weathering of clasts; subordinate qualifications; minor qualifications; additional structure; (GEOLOGIC UNIT).
Rock Description: weathering; colour; texture; fabric and orientation; NAME; strength; additional description, (GEOLOGIC UNIT).

Weathering: RS CW HW MW SW UW

Field Strength — Soil: VS/VL SIL FI/LO SM/MD VS/VD — Rock: HE/EW HW MW MS VS ES

Defect Description (type, orientation, spacing, roughness, persistence aperture, infilling etc)

Samples

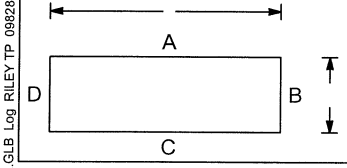
Tests

SKETCH:

MAP

0 m
10 m
20 m
1:1000

Shoring/Support:
Stability:



- Small Disturbed Sample
- Large Disturbed Sample
- U100 Undisturbed Sample
- Permeability Test
- Schmidt Hammer
- Insitu Vane Shear Strength (kPa) P=Peak, R=Residual, UTP=Unable to penetrate
- Scala Penetrometer - blows/50mm

GROUNDWATER
- [ ] None
- [ ] Slow Seep (depth)
- [ ] Rapid Inflow (depth)

PIT TERMINATED DUE TO:
- [X] Target depth
- [ ] Flooding
- [ ] Refusal
- [ ] Machine limit

Remarks

All dimensions in metres Scale 1:50		Shear Vane No.	Logged by: MJB	Checked by:

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RILEY CONSULTANTS Engineers and Geologists
Riley Consultants Ltd
4 Fred Thomas Drive
Takapuna, AKL
Tel: 09 4897872
Fax: 09 4897873

TEST PIT LOG

Project:	Location:	Hole position:	No.:
Greymouth Flood	Greymouth	Below Road	TP23b

Job No.:	Start Date: / Finish Date:	Ground Level (m):	Co-Ordinates ():
09828	22-09-09		

Client:	Hole Depth:	Sheet:
Good Earth Matters	0.60 m	1 of 1

Elevation (m)	Depth (m)	Geological Description	Legend	Weathering	Field Strength	Defect Description	Samples	Tests
	0.20	gravelly silty SAND (topsoil); rounded greywacke gravels <150mm in diameter, dark brown						
	0.60	coarse grained gravelly SAND; rounded greywacke gravels trace-minor rounded greywacke cobbles.						
	1	EOH @ 0.60 m						
	2							
	3							
	4							
	5							

Geological Description: Soil Description: subordinate, praticle size, MAJOR, minor; colour, structure; strength; moisture condition; grading; bedding; plasticity; sensitivity; major qualifications; weathering of clasts; subordinate qualifications; minor qualifications; additional structure; (GEOLOGIC UNIT). Rock Description: weathering; colour; texture; fabric and orientation; NAME; strength; additional description, (GEOLOGIC UNIT).

Weathering: RS CW HW MW SW UW

Field Strength: Soil | Rock — VS/VL SL/LO FI/LO St/D VSt/VD H/VH VW W MS S VS ES

Defect Description: (type, orientation, spacing, roughness, persistence aperture, infilling etc)

SKETCH:

MAP

0 m
10 m
20 m
1:1000

Shoring/Support:
Stability:

A
B
C
D

- Small Disturbed Sample
- Large Disturbed Sample
- U100 Undisturbed Sample
- Permeability Test
- Schmidt Hammer
- Insitu Vane Shear Strength (kPa) P=Peak, R=Residual, UTP=Unable to penetrate
- Scala Penetrometer - blows/50mm

GROUNDWATER
- [ ] None
- [ ] Slow Seep (depth)
- [ ] Rapid Inflow (depth)

PIT TERMINATED DUE TO:
- [X] Target depth
- [ ] Flooding
- [ ] Refusal
- [ ] Machine limit

Remarks

All dimensions in metres Scale 1:50		Shear Vane No.	Logged by: MJB	Checked by:

RILEYAKL.GLB Log RILEY TP 09828.GPJ <<DrawingFile>> 06/10/2009 11:43 Produced by gINT Professional

RILEY CONSULTANTS Engineers and Geologists
Riley Consultants Ltd
4 Fred Thomas Drive
Takapuna, AKL
Tel: 09 4897872
Fax: 09 4897873

TEST PIT LOG

Project:	Location:	Hole position:	No.:
Greymouth Flood	Greymouth	Crest of stopbank	TP24a

Job No.:	Start Date: / Finish Date:	Ground Level (m):	Co-Ordinates ():
09828			

Client:	Hole Depth:	Sheet:
Good Earth Matters	1.00 m	1 of 1

Elevation (m)	Depth (m)	Geological Description	Legend	Weathering	Field Strength (Soil | Rock)	Defect Description (type, orientation, spacing, roughness, persistence aperture, infilling etc)	Samples	Tests
	0.20	TOPSOIL; sand, minor silt, round greywacke gravels						
		gravelly SAND; rounded greywacke gravels generally <50mm in diameter, trace rounded greywackey cobbles, medium grey, non plastic						
	1.00	EOH @ 1.00 m						

Soil Description: subordinate, praticle size, MAJOR, minor; colour, structure; strength; moisture condition; grading; bedding; plasticity; sensitivity; major qualifications; weathering of clasts; subordinate qualifications; minor qualifications; additional structure; (GEOLOGIC UNIT).
Rock Description: weathering; colour; texture; fabric and orientation; NAME; strength; additional description, (GEOLOGIC UNIT).

Weathering: RS CW HW MW SW UW
Field Strength: VS/ML SI/LD SI/MD SI/D VS/VD VS/W HW MW WS SS VS ES

SKETCH:

MAP

0 m
10 m
20 m
1:1000

Shoring/Support:
Stability:

A
B
C
D

- Small Disturbed Sample
- Large Disturbed Sample
- U100 Undisturbed Sample
- Permeability Test
- Schmidt Hammer
- Insitu Vane Shear Strength (kPa) P=Peak, R=Residual, UTP=Unable to penetrate
- Scala Penetrometer - blows/50mm

GROUNDWATER
- [ ] None
- [ ] Slow Seep (depth)
- [ ] Rapid Inflow (depth)

PIT TERMINATED DUE TO:
- [X] Target depth
- [ ] Flooding
- [ ] Refusal
- [ ] Machine limit

Remarks

All dimensions in metres Scale 1:50		Shear Vane No.	Logged by: MJB	Checked by:

RILEYAKL.GLB Log RILEY TP 09828.GPJ <<DrawingFile>> 06/10/2009 11:43 Produced by gINT Professional

RILEY CONSULTANTS
Engineers and Geologists
Riley Consultants
395 Madras Street
CHRISTCHURCH 8011
Tel: 03.379.4402
Fax: 03.379.4403

BORE HOLE LOG

Project:	Location:	Hole position:	No.:
Greymouth Flood Wall Geotech	Greymouth, West Coast		DH1

Job No.:	Start Date: 13-10-09 Finish Date: 13-10-09	Ground Level (m LINZ):	Co-Ordinates (NZMG):
09828		6.90	E 2,362,642.0 N 5,860,582.0

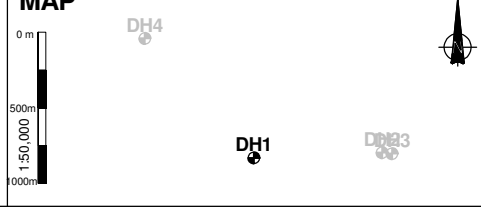
Client:	Hole Depth:	Sheet:
West Coast Regional Council	10.00 m	1 of 1

Type	Run	Fluid & Water	Legend	Geological Description	Elevation (m LINZ)	Depth (m)	Samples	Tests	Backfill / Piezometer
TRC		1 15		Grey sandy fine GRAVEL. Moist (FILL)		1	1-2m		
				2.50 m - 2.95 m Medium to coarse GRAVEL.		2	2-3m SPT2.5m	SPT 2.50 m 2, 2, 2, 3, 3, 5; N = 13	
					+3.40	3	3-4m		
				Sandy GRAVEL. Moist to wet (ALLUVIUM)		4	SPT4.0m	SPT 4.00 m 3, 14, 12, 7, 7, 5; N = 31	
				4.00 m - 4.45 m Medium to coarse GRAVEL with some sand and trace of silt			4-5m		
		1		5.50 m - 5.95 m Medium to coarse GRAVEL with some sand and minor silt 5.50 m Driller comment - increased resistence 5.50 m - 5.95 m Medium to coarse GRAVEL with some sand and minor silt 5.50 m Driller comment - increased resistence		5	5-6m SPT5.5m	SPT 5.50 m 4, 8, 6, 9, 6, 6; N = 27	
						6	6-7m		
				7.00 m - 7.15 m Coarse SAND with minor silt 7.15 m - 7.23 m GRAVEL with minor sand 7.23 m - 7.45 m No recovery 7.50 m - 10.00 m Becomes gravelly SAND with trace of silt.		7	SPT7m	SPT 7.00 m 7, 10, 11, 8, 8, 9; N = 36	
						8	7-8m		
		2			-3.10	9	8-9m		
				EOH @ 10.00 m		10	9-10m		
						11			

Explanations:

- 1 Water Strike (1st, 2nd ...)
- 1 Water Rise (1st, 2nd ...) and Rise Time (minutes)
- Small Disturbed Sample
- Large Disturbed Sample

MAP



Remarks

Material description is of drilled tailings except for SPT split spoon core samples.

Located on intermediate bench behind dolphin statue, 1.7m from wall supporting top bench.

All dimensions in metres Scale 1:73	Contractor: CW Drilling & Investigation Ltd	Rig/Plant Used: Hitachi Ex60 Multidrill	Driller: Barclay Moir	Logged by: AvD	Checked by:

RILEY AGS 3_1 NZ LIB 11.GLB Log RILEY BH 09828 - GREYMOUTH FLOOD WALL.GPJ DWG76988.GDW 21/10/2009 16:02 Produced by gINT Professional

RILEY CONSULTANTS
Engineers and Geologists
Riley Consultants
395 Madras Street
CHRISTCHURCH 8011
Tel: 03.379.4402
Fax: 03.379.4403

BORE HOLE LOG

Project:	Location:	Hole position:	No.:
Greymouth Flood Wall Geotech	Greymouth, West Coast		DH2

Job No.:	Start Date: 13-10-09 Finish Date: 13-10-09	Ground Level (m LINZ):	Co-Ordinates (NZMG):	Sheet:
09828		6.40	E 2,363,490.0 N 5,860,617.0	1 of 1

Client:	Hole Depth:
West Coast Regional Council	6.10 m

Type	Run	Fluid & Water	Legend	Geological Description	Elevation (m LINZ)	Depth (m)	Samples	Tests	Backfill / Piezometer
TRC		1 15 1		Grey fine to medium GRAVEL with some sand and minor silt. Moist (FILL)		1	1-2m		
					+4.60				
				Sandy GRAVEL with minor silt. Moist to wet (ALLUVIUM)		2			
				2.50 m - 2.80 m (SPT core) Dark grey moderately densely packed silty SAND. Moist			2-3m SPT2.5m	SPT 2.50 m Self Pen. 225mm; 1, 1, 0, 0, 0, 0; N = 0	
				2.80 m - 2.90 m (SPT core) sandy SILT with trace of clay. Moist to wet; low plasticity		3			
				3.20 m - 4.80 m Becomes silty sandy GRAVEL			3-4m		
				4.00 m - 4.20 m (SPT core) Boulder		4	SPT4.0m	SPT 4.00 m 19, 7, 9, 6, 4, 3; N = 22	
				4.20 m - 4.30 m (SPT core) Sandy medium GRAVEL. Moist to wet 4.30 m - 4.45 m (SPT core) Sandy fine GRAVEL.			4-5m		
				4.80 m - 5.40 m Becomes gravelly SAND with some silt		5			
					+1.00		5-6m		
				Angular chips of light brown mudstone (COBDEN LIMESTONE)		6			
					+0.30				
				EOH @ 6.10 m		7			

Explanations:

- Water Strike (1st, 2nd ...)
- Water Rise (1st, 2nd ...) and Rise Time (minutes)
- Small Disturbed Sample
- Large Disturbed Sample

MAP

Remarks

Material description is of drilled tailings except for SPT split spoon core samples.

Located on bench 13m downstream of culvert, 3.5m off north edge of vehicle track.

All dimensions in metres Scale 1:48	Contractor: CW Drilling & Investigation Ltd	Rig/Plant Used: Hitachi Ex60 Multidrill	Driller: Barclay Moir	Logged by: AvD	Checked by:

RILEY AGS 3_1 NZ LIB 11.GLB Log RILEY BH 09828 - GREYMOUTH FLOOD WALL.GPJ DWG76988.GDW 21/10/2009 16:02 Produced by gINT Professional

RILEY CONSULTANTS
Engineers and Geologists
Riley Consultants
395 Madras Street
CHRISTCHURCH 8011
Tel: 03.379.4402
Fax: 03.379.4403

BORE HOLE LOG

Project:	Location:	Hole position:	No.:
Greymouth Flood Wall Geotech	Greymouth, West Coast		DH3

Job No.:	Start Date: 13-10-09 Finish Date: 14-10-09	Ground Level (m LINZ):	Co-Ordinates (NZMG):
09828		8.30	E 2,363,556.0 N 5,860,610.0

Client:	Hole Depth:	Sheet:
West Coast Regional Council	7.20 m	1 of 1

Type	Run	Fluid & Water	Legend	Geological Description	Elevation (m LINZ)	Depth (m)	Samples	Tests	Backfill / Piezometer
TRC		15 2 15 1 2		Grey fine to medium GRAVEL with some sand and minor silt. Moist (FILL)	+5.80	1	1-2m		
				Sandy GRAVEL with minor silt. Moist to wet (ALLUVIUM) 2.60 m - 2.70 m lens of organic black/yellow organic (fibrous) silt, low plasticity. 2.80 m Becomes moist to wet		2	2-3m SPT2.5m	SPT 2.50 m 1, 0, 0, 1, 0, 0; N = 1	
						3	3-4m		
				4.00 m - 4.45 m (SPT core) Grey gravelly coarse SAND. Wet to saturated		4	SPT4.0m 4-5m	SPT 4.00 m 4, 11, 6, 11, 10, 7; N = 34	
				Angular chips of light brown mudstone (COBDEN LIMESTONE)	+3.20	5	5-6m		
						6	6-7m		
				EOH @ 7.20 m	+1.10	7			

Explanations:

- Water Strike (1st, 2nd ...)
- Water Rise (1st, 2nd ...) and Rise Time (minutes)
- Small Disturbed Sample
- Large Disturbed Sample

MAP

Remarks

Material description is of drilled tailings except for SPT split spoon core samples

Located on north edge of road, 35m east (along road) from wooden bridge centreline; 2.5m from wing wall.

All dimensions in metres Scale 1:48	Contractor: CW Drilling & Investigation Ltd	Rig/Plant Used: Hitachi Ex60 Multidrill	Driller: Barclay Moir	Logged by: AvD	Checked by:

RILEY AGS 3_1 NZ LIB 11.GLB Log RILEY BH 09828 - GREYMOUTH FLOOD WALL.GPJ DWG76988.GDW 21/10/2009 16:02 Produced by gINT Professional

RILEY CONSULTANTS
Engineers and Geologists
Riley Consultants
395 Madras Street
CHRISTCHURCH 8011
Tel: 03.379.4402
Fax: 03.379.4403

BORE HOLE LOG

Project:	Location:	Hole position:	No.:
Greymouth Flood Wall Geotech	Greymouth, West Coast		DH4

Job No.:	Start Date: 14-10-09 Finish Date: 14-10-09	Ground Level (m LINZ):	Co-Ordinates (NZMG):
09828		6.60	E 2,361,921.0 N 5,861,372.0

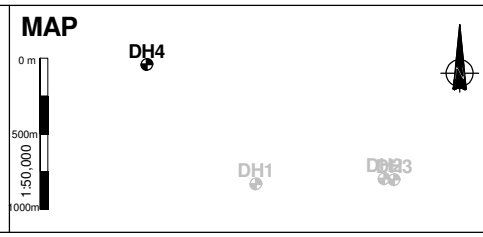
Client:	Hole Depth:	Sheet:
West Coast Regional Council	10.45 m	1 of 1

Type	Run	Fluid & Water	Legend	Geological Description Soil Description: subordinate, particle size, MAJOR, minor; colour, structure; strength; moisture condition; grading; bedding; plasticity; sensitivity; major qualifications; weathering of clasts; subordinate qualifications; minor qualifications; additional structure; geologic unit. Rock Description: weathering; colour; texture; fabric and orientation; NAME; strength; geologic unit.	Elevation (m LINZ)	Depth (m)	Samples	Tests	Backfill / Piezometer
TRC				Grey fine to medium GRAVEL with some sand and minor silt and local cobbles. Moist (FILL)		1			
				1.20 m - 1.70 m Boulder (weak light brown mudstone)			1-2m		
					+4.10	2			
		1 15		Sandy GRAVEL with minor silt. Moist to wet (ALLUVIUM)			2-3m SPT2.5m	SPT 2.50 m 4, 3, 3, 1, 4, 3; N = 11	
						3	3-4m		
		1					SPT4m	SPT 4.00 m 2, 3, 3, 2, 3, 3; N = 11	
						4	4-5m		
						5	5-6m		
						6	6-7m		
				7.00 m - 7.13 m (SPT core) sandy GRAVEL 7.13 m - 7.27 m (SPT core) Coarse SANd with minor SILT 7.25 m - 7.45 m (SPT core) No recovery 7.50 m Becomes more siltly		7	SPT7m	SPT 7.00 m 4, 9, 16, 10, 9, 11; N = 46	
							7-8m		
						8			
				8.50 m - 8.62 m (SPT core) Cobble/boulder 8.62 m - 8.71 m (SPT core) Dark grey silty SAND. Wet 8.71 m - 8.95 m (SPT core) No recovery			8-9m SPT8.5m	SPT 8.50 m 6, 6, 11, 8, 10, 6; N = 35	
						9			
							9-10m		
SPT		2		10.00 m - 10.45 m (SPT core) Coarse to medium GRAVEL		10	SPT10m	SPT 10.00 m 2, 3, 5, 4, 5, 4; N = 18	
					-3.85				
				EOH @ 10.45 m		11			

Explanations:

- 1 ▼ Water Strike (1st, 2nd ...)
- 1 ▽ Water Rise (1st, 2nd ...) and Rise Time (minutes)
- ● Small Disturbed Sample
- ⌇ Large Disturbed Sample

MAP



Remarks

Material description is of drilled tailings except for SPT split spoon core samples.

Located immediately southwest of culvert on Hill Quay, Cobden (south side of road).

All dimensions in metres Scale 1:73	Contractor: CW Drilling & Investigation Ltd	Rig/Plant Used: Hitachi Ex60 Multidrill	Driller: Barclay Moir	Logged by: AvD	Checked by:

RILEY AGS 3_1 NZ LIB 11.GLB Log RILEY BH 09828 - GREYMOUTH FLOOD WALL.GPJ DWG76988.GDW 21/10/2009 16:02 Produced by gINT Professional

APPENDIX 3

Laboratory Test Results

Canterbury Laboratory

325 Pound Rd, Yaldhurst
PO Box 16-064, Christchurch 8441
Telephone: +64 3 349 9142
Facsimile: +64 3 349 9143
www.fultonhogan.com
0800 LABORATORY

Material Test Report

Report No: MAT:CAN09S-6040
Issue No: 1

Client:
Riley Consultants Ltd
PO Box 4355
Christchurch Mail Centre

Christchurch 8140
NZ

Project: QA Testing - Aggregates

The test (s) reported herein (unless indicated) have been performed in accordance with the laboratory's scope of accreditation. Results only apply to samples as received. This report must be reproduced in full.

Approved Signatory: Max Burford (Supervisor)
IANZ Accreditation No:200
Date of Issue: 30/09/09

Sample Details

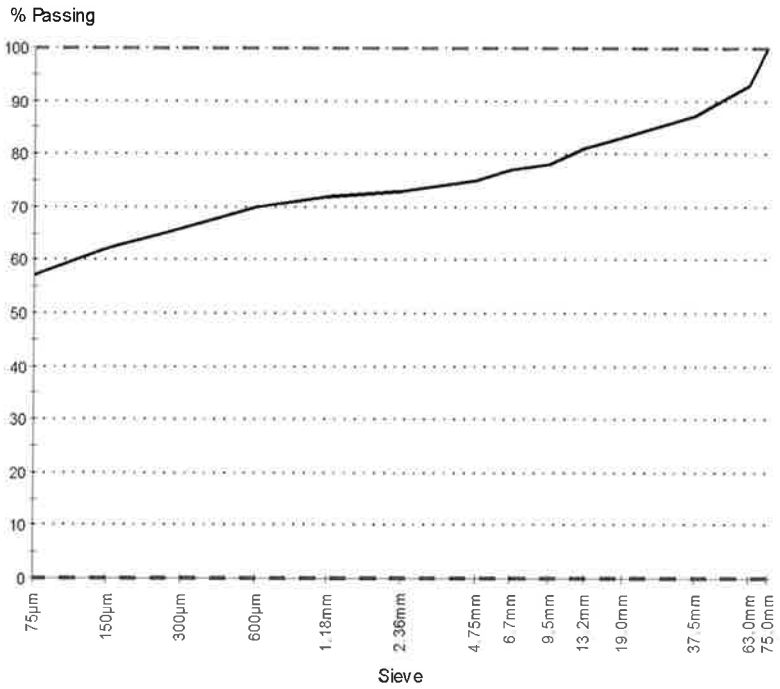
Sample ID:	CAN09S-6040
Client Sample ID:	TP10 O/N 09828
Material:	Clay
Sample Source:	Miscellaneous Source
Site/Sampled From:	Greymouth Flood Walls TP10
Date Sampled:	18/09/2009
Specification:	No Specification
Sampled By:	Advised - See Comments
Sampling Method:	As Received - Not Accredited
Date Tested:	30/09/2009
Technician:	Max Burford
Sampling Endorsed:	No

Other Test Results

Description	Method	Result	Limits

Particle Size Distribution

Method: NZS 4407:1991 Test 3.8.2
Drying by: Oven



Sieve Size	% Passing	Limits
75.0mm	100	0 – 100
63.0mm	93	0 – 100
37.5mm	87	0 – 100
19.0mm	83	0 – 100
13.2mm	81	0 – 100
9.5mm	78	0 – 100
6.7mm	77	0 – 100
4.75mm	75	0 – 100
2.36mm	73	0 – 100
1.18mm	72	0 – 100
600µm	70	0 – 100
300µm	66	0 – 100
150µm	62	0 – 100
75µm	57	0 – 100

Comments
N/A

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Canterbury Laboratory

325 Pound Rd, Yaldhurst
PO Box 16-064, Christchurch 8441
Telephone: +64 3 349 9142
Facsimile: +64 3 349 9143
www.fultonhogan.com
0800 LABORATORY

Material Test Report

Report No: MAT:CAN09S-6043
Issue No: 1

Client:
Riley Consultants Ltd
PO Box 4355
Christchurch Mail Centre

Christchurch 8140
NZ

Project: QA Testing - Aggregates

The test (s) reported herein (unless indicated) have been performed in accordance with the laboratory's scope of accreditation. Results only apply to samples as received. This report must be reproduced in full.

Approved Signatory: Max Burford
(Supervisor)
IANZ Accreditation No:200
Date of Issue: 30/09/09

Sample Details

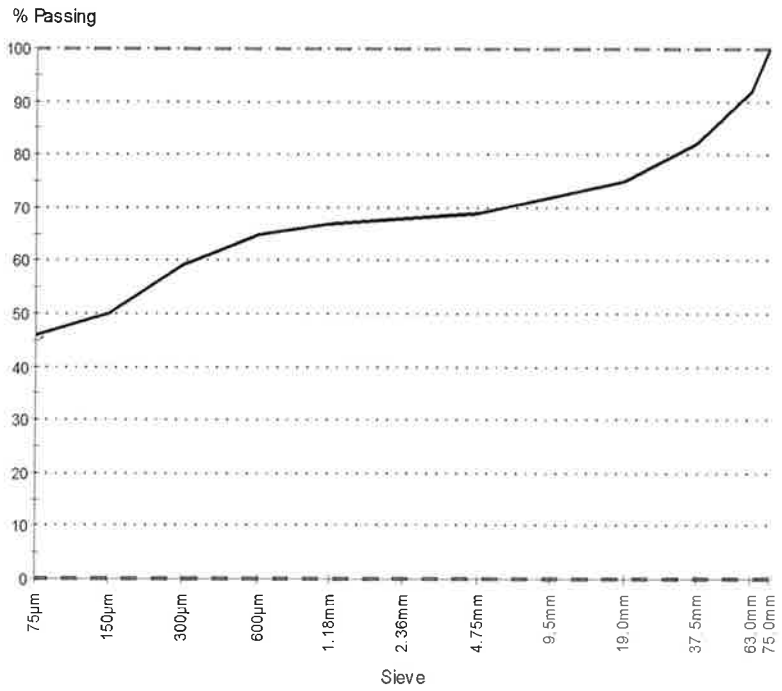
Sample ID:	CAN09S-6043
Client Sample ID:	TP12 O/N 09828
Material:	Gravelly Sandy SILT
Sample Source:	Miscellaneous Source
Site/Sampled From:	Greymouth Flood Walls TP 12
Date Sampled:	18/09/2009
Specification:	No Specification
Sampled By:	Advised - See Comments
Sampling Method:	As Received - Not Accredited
Date Tested:	30/09/2009
Technician:	Max Burford
Sampling Endorsed:	No

Other Test Results

Description	Method	Result	Limits

Particle Size Distribution

Method: NZS 4407:1991 Test 3.8.2
Drying by: Oven



Sieve Size	% Passing	Limits
75.0mm	100	0 – 100
63.0mm	92	0 – 100
37.5mm	82	0 – 100
19.0mm	75	0 – 100
9.5mm	72	0 – 100
4.75mm	69	0 – 100
2.36mm	68	0 – 100
1.18mm	67	0 – 100
600µm	65	0 – 100
300µm	59	0 – 100
150µm	50	0 – 100
75µm	46	0 – 100
63µm	45	0 – 100

Comments

Sampled by Alan Williams
Field Moisture Content = 20.7%

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Canterbury Laboratory

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Facsimile: +64 3 349 9143
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0800 LABORATORY

Material Test Report

Report No: MAT:CAN09S-6047
Issue No: 1

Client:
Riley Consultants Ltd
PO Box 4355
Christchurch Mail Centre

Christchurch 8140
NZ

Project: QA Testing - Aggregates

The test (s) reported herein (unless indicated) have been performed in accordance with the laboratory's scope of accreditation. Results only apply to samples as received. This report must be reproduced in full.

Approved Signatory: Max Burford (Supervisor)
IANZ Accreditation No:200
Date of Issue: 30/09/09

Sample Details

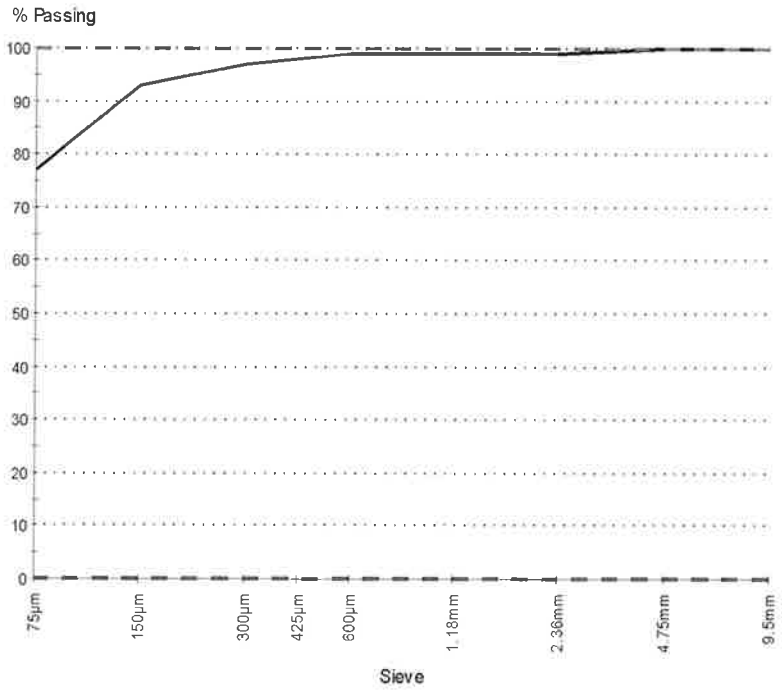
Sample ID:	CAN09S-6047
Client Sample ID:	TP 22 O/N 90828
Material:	Sandy SILT
Sample Source:	Miscellaneous Source
Site/Sampled From:	Greymouth Flood Walls TP 22
Date Sampled:	21/09/2009
Specification:	No Specification
Sampled By:	Advised - See Comments
Sampling Method:	As Received - Not Accredited
Date Tested:	30/09/2009
Technician:	Max Burford
Sampling Endorsed:	No

Other Test Results

Description	Method	Result	Limits

Particle Size Distribution

Method: NZS 4407:1991 Test 3.8.2
Drying by: Oven



Sieve Size	% Passing	Limits
9.5mm	100	0 – 100
4.75mm	100	0 – 100
2.36mm	99	0 – 100
1.18mm	99	0 – 100
600µm	99	0 – 100
425µm	98	0 – 100
300µm	97	0 – 100
150µm	93	0 – 100
75µm	77	0 – 100
63µm	70	0 – 100

Comments

Sampled by Alan Williams
Field Moisture Content = 37.6%

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Canterbury Laboratory

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Facsimile: +64 3 349 9143
www.fultonhogan.com
0800 LABORATORY

Maximum Dry Density Report

Report No: MDD:CAN09S-6040
Issue No: 1

Client:
Riley Consultants Ltd
PO Box 4355
Christchurch Mail Centre

Christchurch 8140
NZ

Project: QA Testing - Aggregates

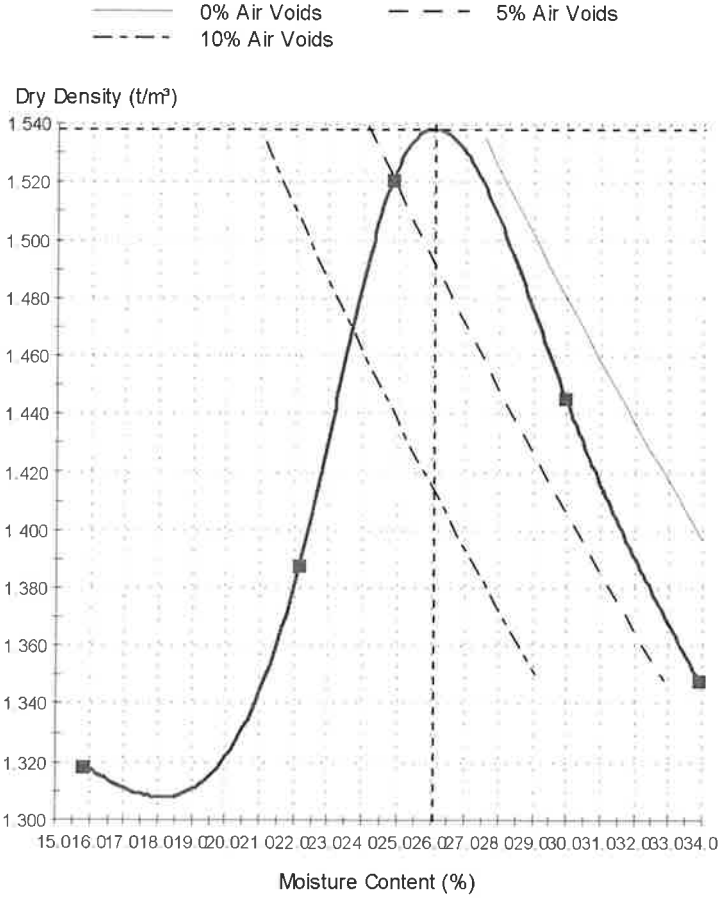
The test (s) reported herein (unless indicated) have been performed in accordance with the laboratory's scope of accreditation. Results only apply to samples as received. This report must be reproduced in full.

Approved Signatory: Max Burford
(Supervisor)
IANZ Accreditation No:200
Date of Issue: 30/09/09

Sample Details

Sample ID:	CAN09S-6040	**Material:**	Clay
Client Sample ID:	TP10 O/N 09828	**Material Source:**	Miscellaneous Source
Date Sampled:	18/09/09	**Sampled By:**	Advised - See Comments
Sampling Method:	As Received - Not Accredited	**Sampled From:**	Greymouth Flood Walls TP10
Date Tested:	30/09/09	**Specification:**	No Specification
Technician:	Max Burford	**Endorsed Sample?:**	No

Dry Density - Moisture Relationship



Test Results

NZS 4402:1986 Test 4.1.1

Maximum Dry Density (t/m³):	**1.54**
Optimum Moisture Content (%):	**26**
Assumed Solid Density (t/m³):	2.660
Oversize Sieve (mm):	19.0
Oversize Material (%):	17
Sample History:	Natural

Comments

As received moisture content = 33.8%
Sorry about X axis - this computer system is a work in progress

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Canterbury Laboratory

325 Pound Rd, Yaldhurst
PO Box 16-064, Christchurch 8441
Telephone: +64 3 349 9142
Facsimile: +64 3 349 9143
www.fultonhogan.com
0800 LABORATORY

Material Test Report

Report No: MAT:CAN09S-6045
Issue No: 1

Client:
Riley Consultants Ltd
PO Box 4355
Christchurch Mail Centre

Christchurch 8140
NZ

Project: QA Testing - Aggregates

The test (s) reported herein (unless indicated) have been performed in accordance with the laboratory's scope of accreditation. Results only apply to samples as received. This report must be reproduced in full.

Approved Signatory: Max Burford (Supervisor)
IANZ Accreditation No:200
Date of Issue: 30/09/09

Sample Details

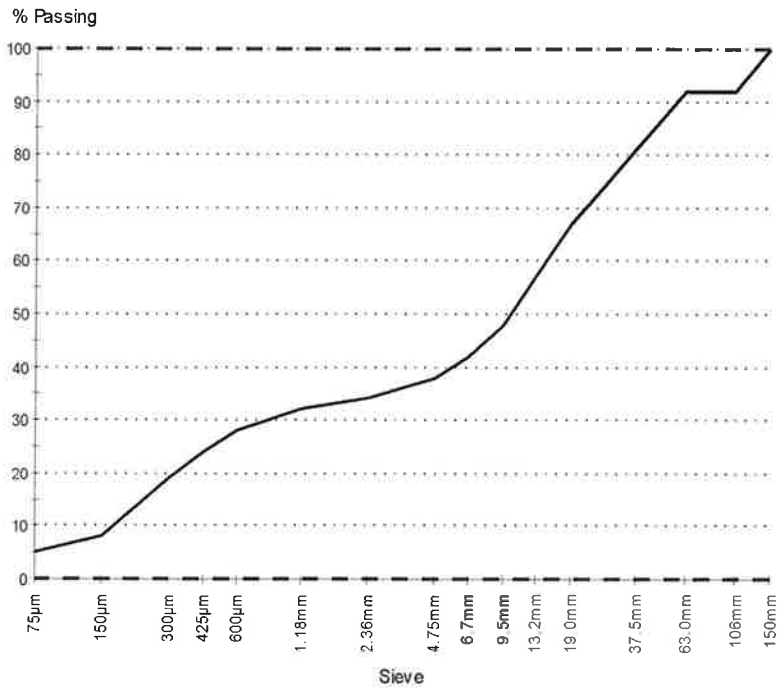
Sample ID:	CAN09S-6045
Client Sample ID:	TP18 O/N 09828
Material:	Sandy Gravel
Sample Source:	Miscellaneous Source
Site/Sampled From:	Greymouth Flood Walls TP18
Date Sampled:	21/09/2009
Specification:	No Specification
Sampled By:	Advised - See Comments
Sampling Method:	As Received - Not Accredited
Date Tested:	30/09/2009
Technician:	Max Burford
Sampling Endorsed:	No

Other Test Results

Description	Method	Result	Limits

Particle Size Distribution

Method: NZS 4407:1991 Test 3.8.2
Drying by: Oven



Sieve Size	% Passing	Limits
150mm	100	0 – 100
106mm	92	0 – 100
63.0mm	92	0 – 100
37.5mm	81	0 – 100
19.0mm	67	0 – 100
13.2mm	57	0 – 100
9.5mm	48	0 – 100
6.7mm	42	0 – 100
4.75mm	38	0 – 100
2.36mm	34	0 – 100
1.18mm	32	0 – 100
600µm	28	0 – 100
425µm	24	0 – 100
300µm	19	0 – 100
150µm	8	0 – 100
75µm	5	0 – 100

Comments

Sampled by Alan Williams
Field Moisture Content = 5.1%

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Canterbury Laboratory

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Facsimile: +64 3 349 9143
www.fultonhogan.com
0800 LABORATORY

Material Test Report

Report No: MAT:CAN09S-6041
Issue No: 1

Client:
Riley Consultants Ltd
PO Box 4355
Christchurch Mail Centre

Christchurch 8140
NZ

Project: QA Testing - Aggregates

The test (s) reported herein (unless indicated) have been performed in accordance with the laboratory's scope of accreditation. Results only apply to samples as received. This report must be reproduced in full.

Approved Signatory: Max Burford
(Supervisor)
IANZ Accreditation No:200
Date of Issue: 30/09/09

Sample Details

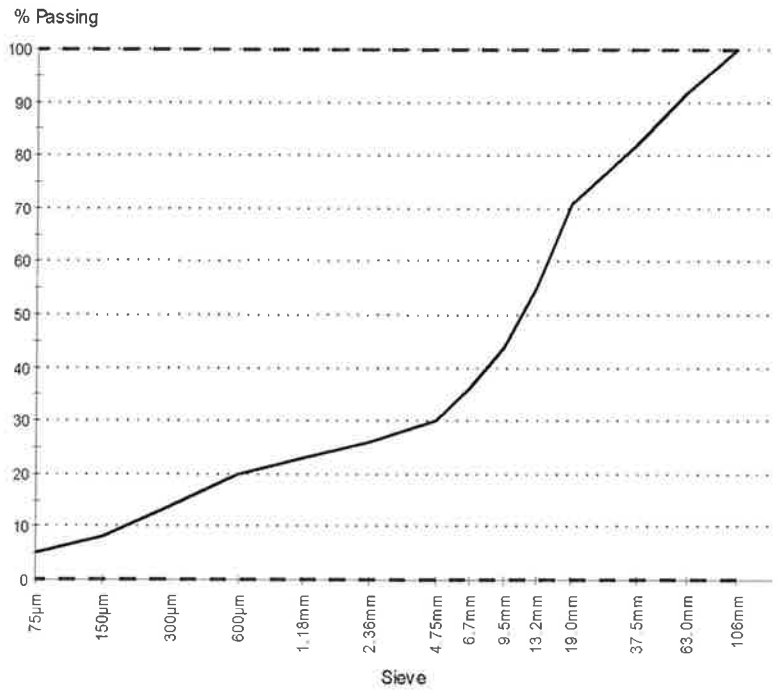
Sample ID:	CAN09S-6041
Client Sample ID:	TP7 O/N 09828
Material:	Sandy Gravel
Sample Source:	Miscellaneous Source
Site/Sampled From:	Greymouth Flood Walls TP7
Date Sampled:	17/09/2009
Specification:	No Specification
Sampled By:	Advised - See Comments
Sampling Method:	As Received - Not Accredited
Date Tested:	30/09/2009
Technician:	Max Burford
Sampling Endorsed:	No

Other Test Results

Description	Method	Result	Limits

Particle Size Distribution

Method: NZS 4407:1991 Test 3.8.2
Drying by: Oven



Sieve Size	% Passing	Limits
106mm	100	0 – 100
63.0mm	92	0 – 100
37.5mm	82	0 – 100
19.0mm	71	0 – 100
13.2mm	55	0 – 100
9.5mm	44	0 – 100
6.7mm	36	0 – 100
4.75mm	30	0 – 100
2.36mm	26	0 – 100
1.18mm	23	0 – 100
600µm	20	0 – 100
300µm	14	0 – 100
150µm	8	0 – 100
75µm	5	0 – 100

Comments

Sampled by Alan Williams
Field moisture Content = 15.5%

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Telephone: +64 3 349 9142
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Material Test Report

Report No: MAT:CAN09S-6042
Issue No: 1

Client:
Riley Consultants Ltd
PO Box 4355
Christchurch Mail Centre

Christchurch 8140
NZ

Project: QA Testing - Aggregates

The test (s) reported herein (unless indicated) have been performed in accordance with the laboratory's scope of accreditation. Results only apply to samples as received. This report must be reproduced in full.

Approved Signatory: Max Burford (Supervisor)
IANZ Accreditation No:200
Date of Issue: 30/09/09

Sample Details

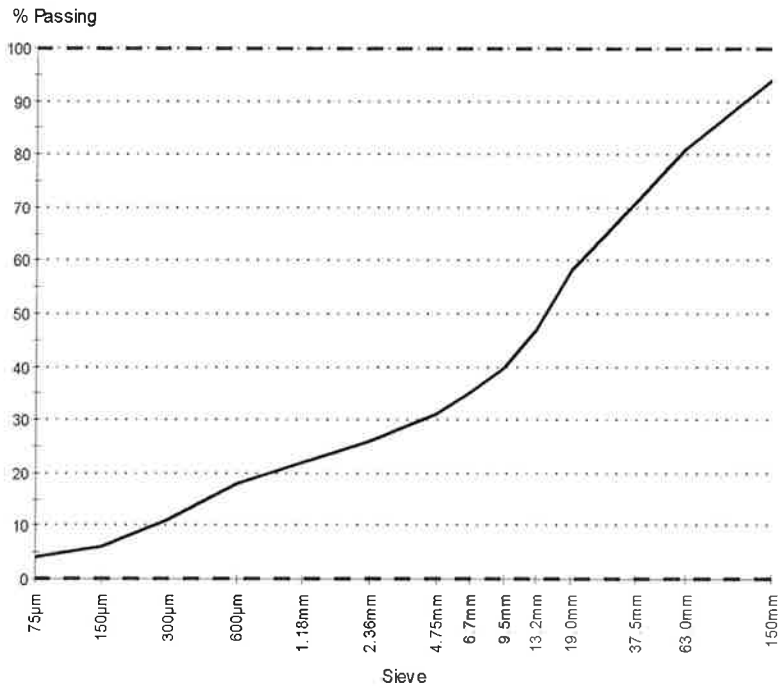
Sample ID:	CAN09S-6042
Client Sample ID:	TP11 O/N 90828
Material:	Sandy Gravel
Sample Source:	Miscellaneous Source
Site/Sampled From:	Greymouth Flood Walls TP11
Date Sampled:	18/09/2009
Specification:	No Specification
Sampled By:	Advised - See Comments
Sampling Method:	As Received - Not Accredited
Date Tested:	30/09/2009
Technician:	Max Burford
Sampling Endorsed:	No

Other Test Results

Description	Method	Result	Limits

Particle Size Distribution

Method: NZS 4407:1991 Test 3.8.2
Drying by: Oven



Sieve Size	% Passing	Limits
150mm	94	0 – 100
63.0mm	81	0 – 100
37.5mm	71	0 – 100
19.0mm	58	0 – 100
13.2mm	47	0 – 100
9.5mm	40	0 – 100
6.7mm	35	0 – 100
4.75mm	31	0 – 100
2.36mm	26	0 – 100
1.18mm	22	0 – 100
600µm	18	0 – 100
300µm	11	0 – 100
150µm	6	0 – 100
75µm	4	0 – 100

Comments

Sampled by Alan Williams
Field Moisture Content = 4.5%

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325 Pound Rd, Yaldhurst
PO Box 16-064, Christchurch 8441
Telephone: +64 3 349 9142
Facsimile: +64 3 349 9143
www.fultonhogan.com
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Material Test Report

Report No: MAT:CAN09S-6044
Issue No: 1

Client:
Riley Consultants Ltd
PO Box 4355
Christchurch Mail Centre

Christchurch 8140
NZ

Project: QA Testing - Aggregates

The test (s) reported herein (unless indicated) have been performed in accordance with the laboratory's scope of accreditation. Results only apply to samples as received. This report must be reproduced in full.

Approved Signatory: Max Burford
(Supervisor)
IANZ Accreditation No:200
Date of Issue: 30/09/09

Sample Details

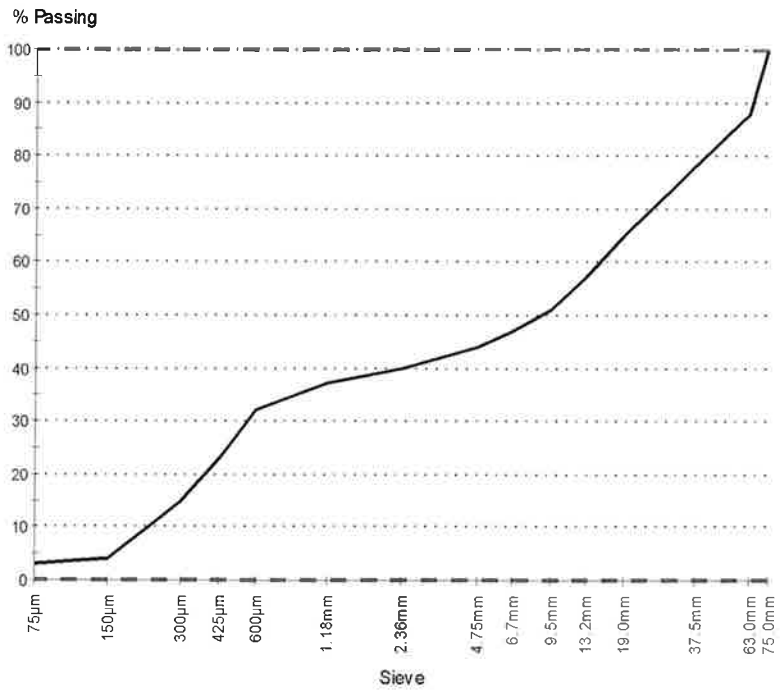
Sample ID:	CAN09S-6044
Client Sample ID:	TP4 O/N 09828
Material:	Sand
Sample Source:	Miscellaneous Source
Site/Sampled From:	Greymouth Flood Walls TP4
Date Sampled:	17/09/2009
Specification:	No Specification
Sampled By:	Advised - See Comments
Sampling Method:	As Received - Not Accredited
Date Tested:	30/09/2009
Technician:	Max Burford
Sampling Endorsed:	No

Other Test Results

Description	Method	Result	Limits

Particle Size Distribution

Method: NZS 4407:1991 Test 3.8.2
Drying by: Oven



Sieve Size	% Passing	Limits
75.0mm	100	0 – 100
63.0mm	88	0 – 100
37.5mm	78	0 – 100
19.0mm	65	0 – 100
13.2mm	57	0 – 100
9.5mm	51	0 – 100
6.7mm	47	0 – 100
4.75mm	44	0 – 100
2.36mm	40	0 – 100
1.18mm	37	0 – 100
600µm	32	0 – 100
425µm	23	0 – 100
300µm	15	0 – 100
150µm	4	0 – 100
75µm	3	0 – 100

Comments

Field moisture content = 4.3%

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325 Pound Rd, Yaldhurst
PO Box 16-064, Christchurch 8441
Telephone: +64 3 349 9142
Facsimile: +64 3 349 9143
www.fultonhogan.com
0800 LABORATORY

Material Test Report

Report No: MAT:CAN09S-6046
Issue No: 1

Client:
Riley Consultants Ltd
PO Box 4355
Christchurch Mail Centre

Christchurch 8140
NZ

Project: QA Testing - Aggregates

The test (s) reported herein (unless indicated) have been performed in accordance with the laboratory's scope of accreditation. Results only apply to samples as received. This report must be reproduced in full.

Approved Signatory: Max Burford (Supervisor)
IANZ Accreditation No:200
Date of Issue: 30/09/09

Sample Details

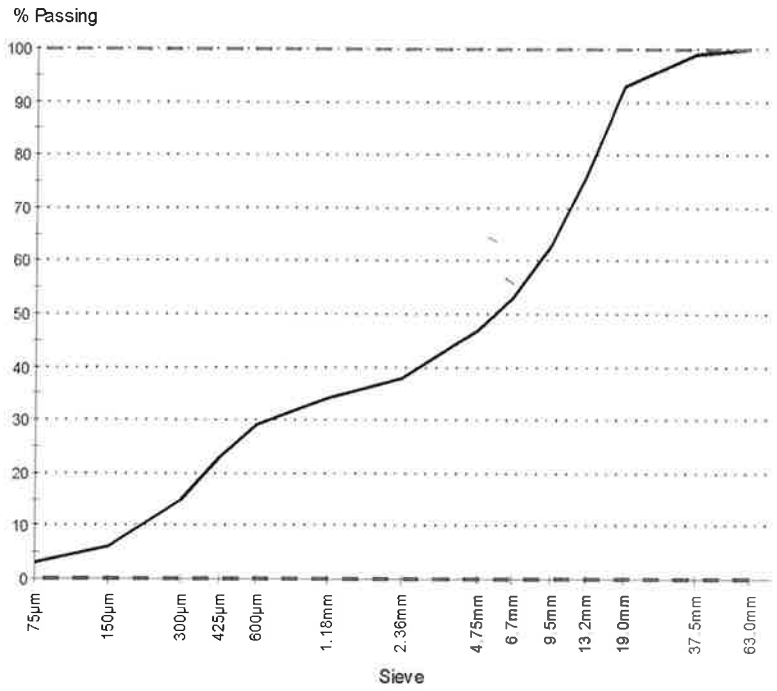
Sample ID:	CAN09S-6046
Client Sample ID:	TP20 O/N 09828
Material:	Sandy Gravel
Sample Source:	Miscellaneous Source
Site/Sampled From:	Greymouth Flood Walls TP20
Date Sampled:	21/09/2009
Specification:	No Specification
Sampled By:	Advised - See Comments
Sampling Method:	As Received - Not Accredited
Date Tested:	30/09/2009
Technician:	Max Burford
Sampling Endorsed:	No

Other Test Results

Description	Method	Result	Limits

Particle Size Distribution

Method: NZS 4407:1991 Test 3.8.2
Drying by: Oven



Sieve Size	% Passing	Limits
63.0mm	100	0 – 100
37.5mm	99	0 – 100
19.0mm	93	0 – 100
13.2mm	76	0 – 100
9.5mm	63	0 – 100
6.7mm	53	0 – 100
4.75mm	47	0 – 100
2.36mm	38	0 – 100
1.18mm	34	0 – 100
600µm	29	0 – 100
425µm	23	0 – 100
300µm	15	0 – 100
150µm	6	0 – 100
75µm	3	0 – 100

Comments

Sampled by Alan Williams
Field Moisture Content = 15.9%

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325 Pound Rd, Yaldhurst
PO Box 16-064, Christchurch 8441
Telephone: +64 3 349 9142
Facsimile: +64 3 349 9143
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0800 LABORATORY

Material Test Report

Report No: MAT:CAN09S-6048
Issue No: 1

Client:
Riley Consultants Ltd
PO Box 4355
Christchurch Mail Centre

Christchurch 8140
NZ

Project: QA Testing - Aggregates

The test (s) reported herein (unless indicated) have been performed in accordance with the laboratory's scope of accreditation. Results only apply to samples as received. This report must be reproduced in full.

Approved Signatory: Max Burford (Supervisor)
IANZ Accreditation No:200
Date of Issue: 30/09/09

Sample Details

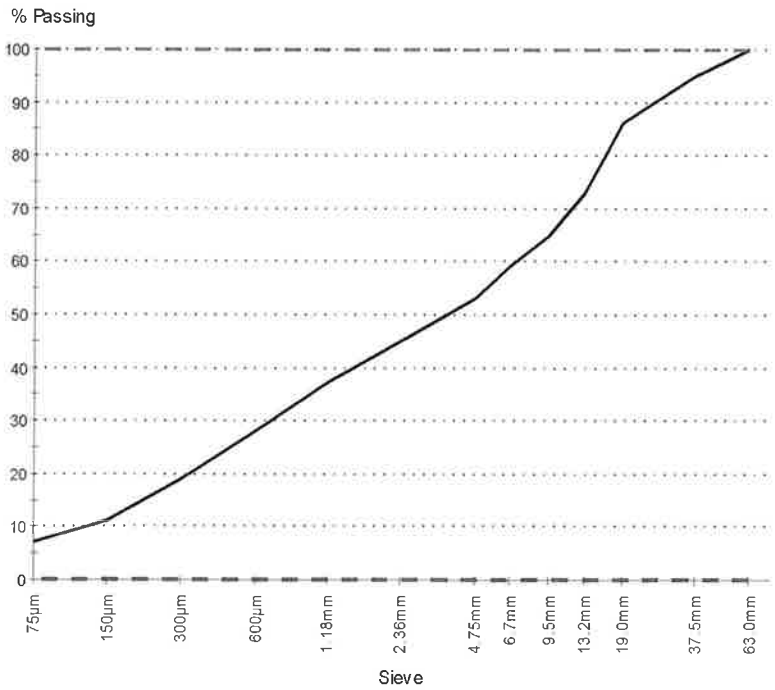
Sample ID:	CAN09S-6048
Client Sample ID:	TP 13 O/N 90828
Material:	Sandy Gravel
Sample Source:	Miscellaneous Source
Site/Sampled From:	Greymouth Flood Walls TP 13
Date Sampled:	18/09/2009
Specification:	No Specification
Sampled By:	Advised - See Comments
Sampling Method:	As Received - Not Accredited
Date Tested:	30/09/2009
Technician:	Max Burford
Sampling Endorsed:	No

Other Test Results

Description	Method	Result	Limits

Particle Size Distribution

Method: NZS 4407:1991 Test 3.8.2
Drying by: Oven



Sieve Size	% Passing	Limits
63.0mm	100	0 – 100
37.5mm	95	0 – 100
19.0mm	86	0 – 100
13.2mm	73	0 – 100
9.5mm	65	0 – 100
6.7mm	59	0 – 100
4.75mm	53	0 – 100
2.36mm	45	0 – 100
1.18mm	37	0 – 100
600µm	28	0 – 100
300µm	19	0 – 100
150µm	11	0 – 100
75µm	7	0 – 100

Comments

Sampled by Alan Williams - Field Moisture Content = 18.9%
Estimated Total Coal Content of Sample = 46% (Calculated from 19.0mm - 4.75mm by mass)
(minus 4.75mm fraction by bulk density)

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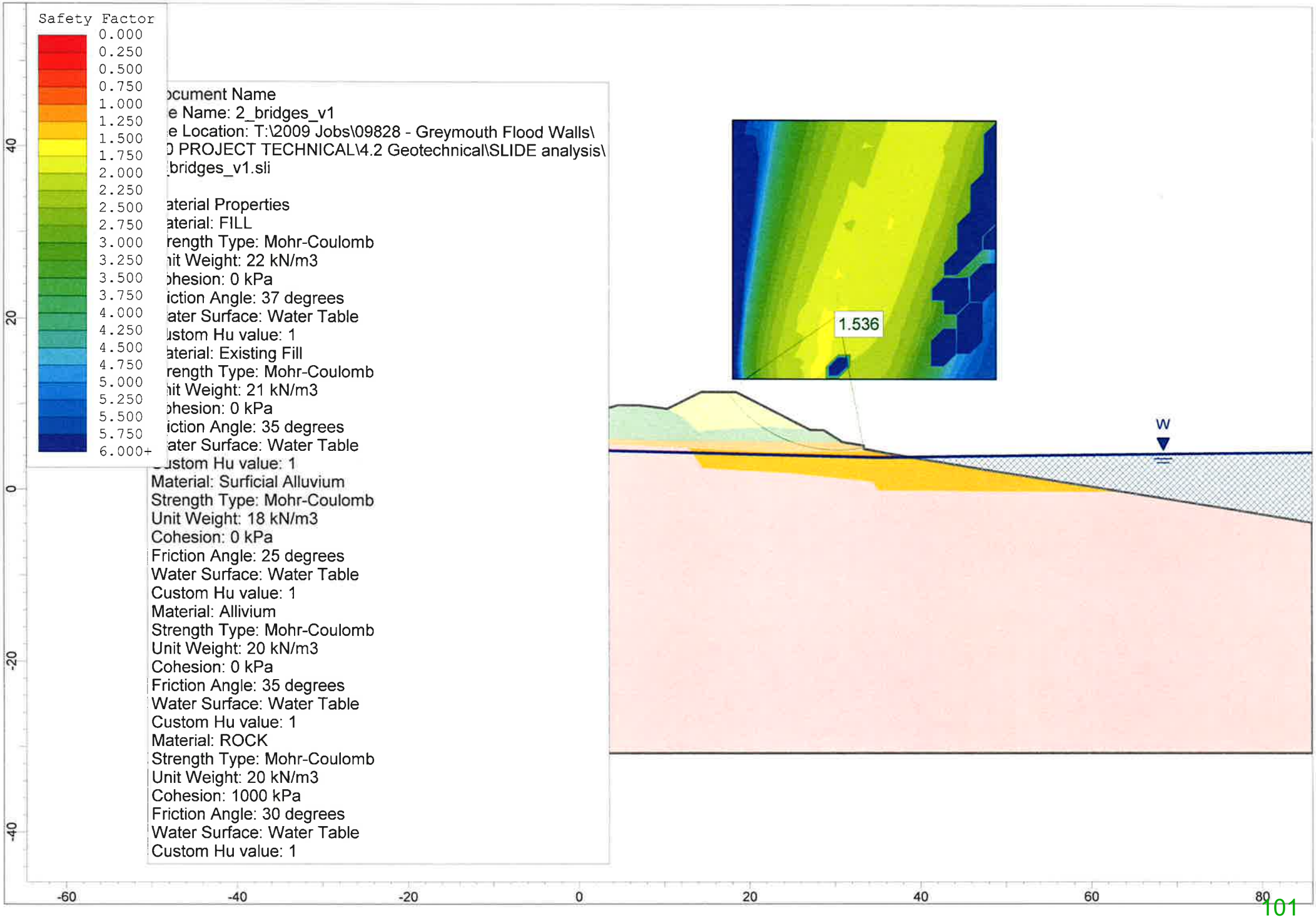
APPENDIX 4

Stability Assessment Printouts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1.000
1.250
1.500
1.750
2.000
2.250
2.500
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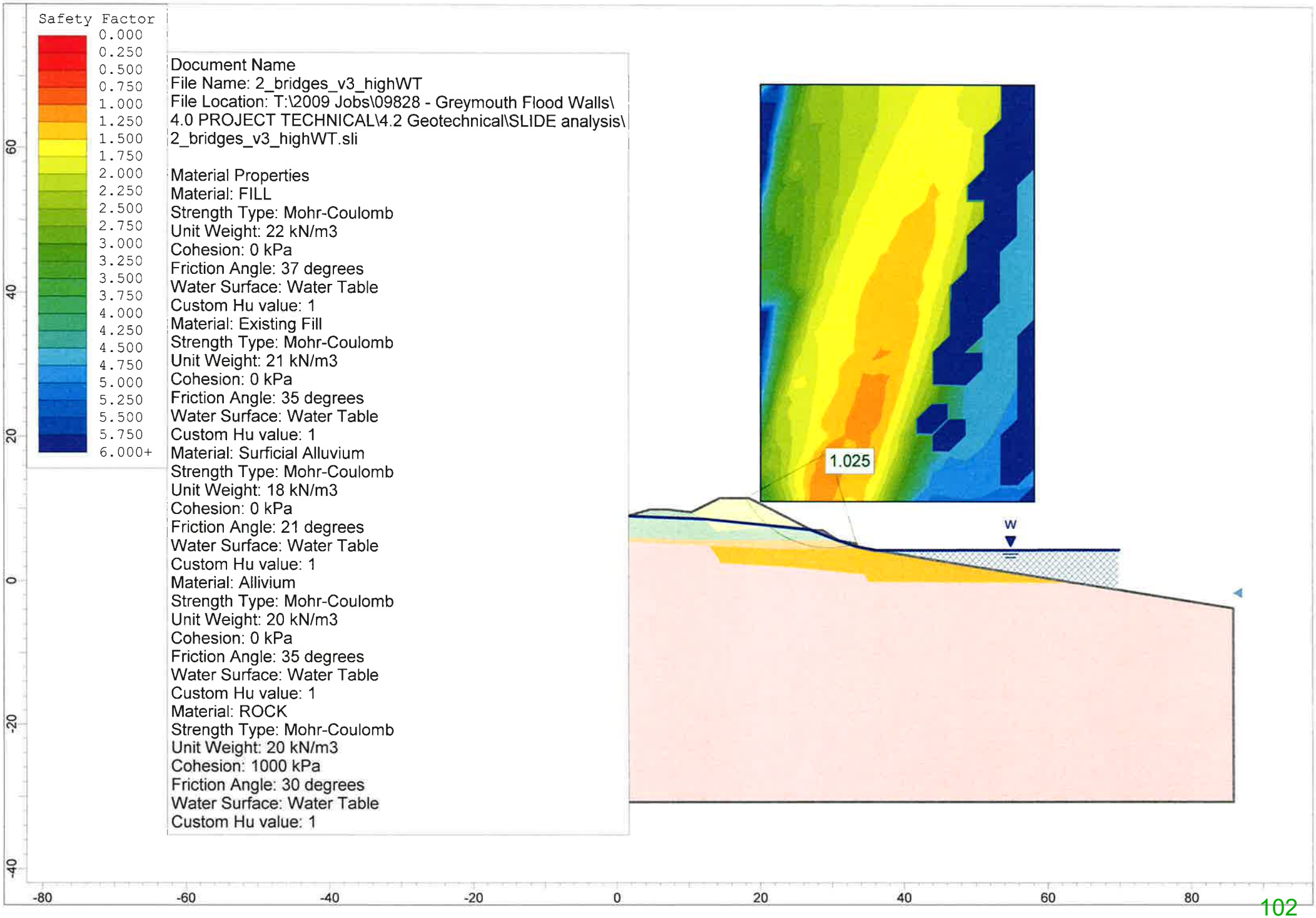
3.000
3.250
3.500
3.750
4.000
4.250
4.500
4.750
5.000
5.250
5.500
5.750
6.000+
ocument Name
e Name: 2_bridges_v1
e Location: T:\2009 Jobs\09828 - Greymouth Flood Walls\
0 PROJECT TECHNICAL\4.2 Geotechnical\SLIDE analysis\
bridges_v1.sli
aterial Properties
aterial: FILL
rength Type: Mohr-Coulomb
it Weight: 22 kN/m3
hesion: 0 kPa
iction Angle: 37 degrees
ater Surface: Water Table
ustom Hu value: 1
aterial: Existing Fill
rength Type: Mohr-Coulomb
it Weight: 21 kN/m3
hesion: 0 kPa
iction Angle: 35 degrees
ater Surface: Water Table
ustom Hu value: 1
Material: Surficial Alluvium
Strength Type: Mohr-Coulomb
Unit Weight: 18 kN/m3
Cohesion: 0 kPa
Friction Angle: 25 degrees
Water Surface: Water Table
Custom Hu value: 1
Material: Allivium
Strength Type: Mohr-Coulomb
Unit Weight: 20 kN/m3
Cohesion: 0 kPa
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1
Material: ROCK
Strength Type: Mohr-Coulomb
Unit Weight: 20 kN/m3
Cohesion: 1000 kPa
Friction Angle: 30 degrees
Water Surface: Water Table
Custom Hu value: 1
1.536
W
40
20
0
-20
-40
-60
-40
-20
0
20
40
60
80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0.500
0.750
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1.250
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1.750
2.000
2.250
2.500
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3.000
3.250
3.500
3.750
4.000
4.250
4.500
4.750
5.000
5.250
5.500
5.750
6.000+
Document Name
File Name: 2_bridges_v3_highWT
File Location: T:\2009 Jobs\09828 - Greymouth Flood Walls\
4.0 PROJECT TECHNICAL\4.2 Geotechnical\SLIDE analysis\
2_bridges_v3_highWT.sli
Material Properties
Material: FILL
Strength Type: Mohr-Coulomb
Unit Weight: 22 kN/m3
Cohesion: 0 kPa
Friction Angle: 37 degrees
Water Surface: Water Table
Custom Hu value: 1
Material: Existing Fill
Strength Type: Mohr-Coulomb
Unit Weight: 21 kN/m3
Cohesion: 0 kPa
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1
Material: Surficial Alluvium
Strength Type: Mohr-Coulomb
Unit Weight: 18 kN/m3
Cohesion: 0 kPa
Friction Angle: 21 degrees
Water Surface: Water Table
Custom Hu value: 1
Material: Allivium
Strength Type: Mohr-Coulomb
Unit Weight: 20 kN/m3
Cohesion: 0 kPa
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1
Material: ROCK
Strength Type: Mohr-Coulomb
Unit Weight: 20 kN/m3
Cohesion: 1000 kPa
Friction Angle: 30 degrees
Water Surface: Water Table
Custom Hu value: 1
1.025
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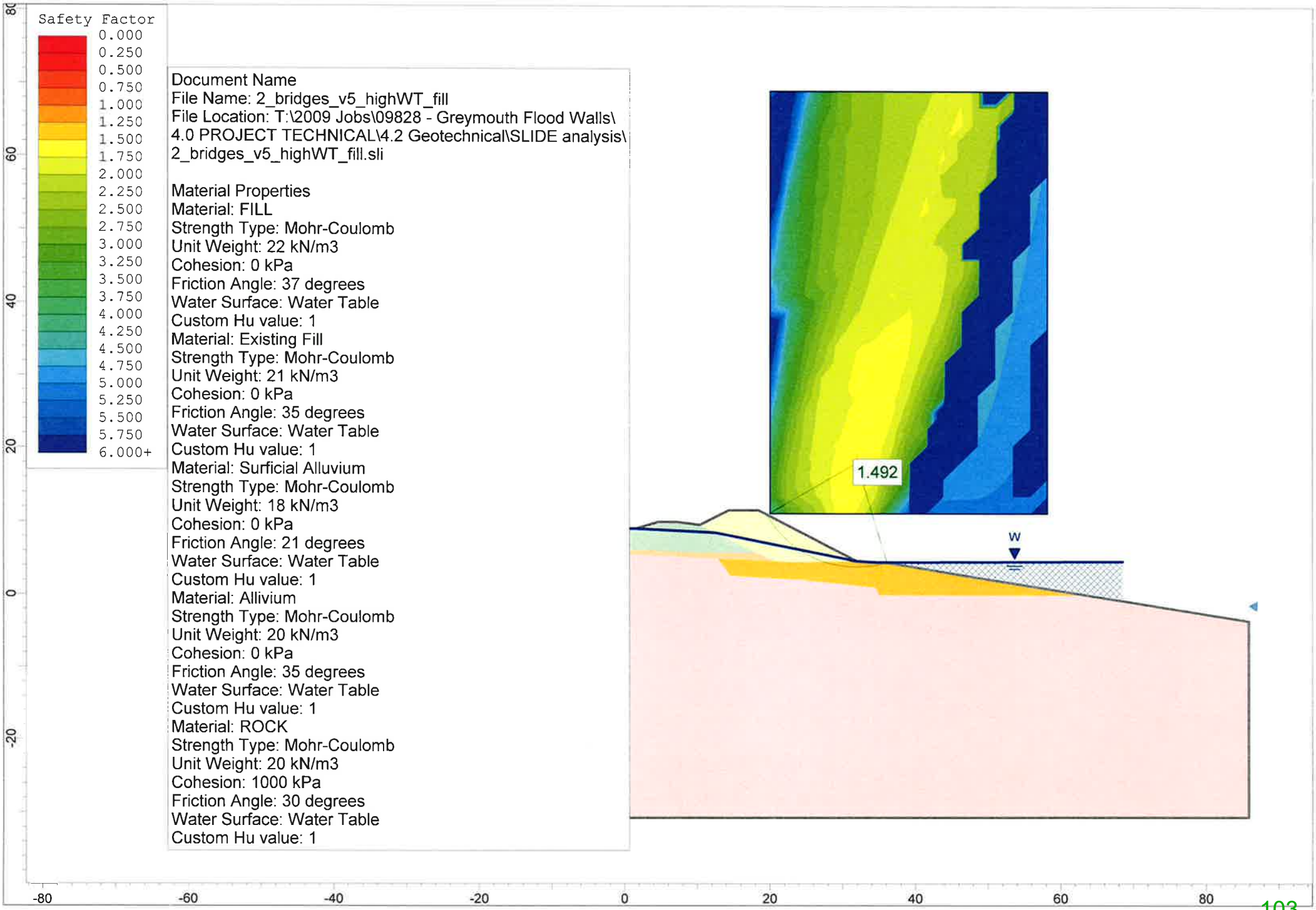
40
20
0
-20
-40
-80
-60
-40
-20
0
20
40
60
80


Safety Factor
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0.750
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1.250
1.500
1.750
2.000
2.250
2.500
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3.000
3.250
3.500
3.750
4.000
4.250
4.500
4.750
5.000
5.250
5.500
5.750
6.000+
Document Name
File Name: 2_bridges_v5_highWT_fill
File Location: T:\2009 Jobs\09828 - Greymouth Flood Walls\
4.0 PROJECT TECHNICAL\4.2 Geotechnical\SLIDE analysis\
2_bridges_v5_highWT_fill.sli
Material Properties
Material: FILL
Strength Type: Mohr-Coulomb
Unit Weight: 22 kN/m3
Cohesion: 0 kPa
Friction Angle: 37 degrees
Water Surface: Water Table
Custom Hu value: 1
Material: Existing Fill
Strength Type: Mohr-Coulomb
Unit Weight: 21 kN/m3
Cohesion: 0 kPa
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1
Material: Surficial Alluvium
Strength Type: Mohr-Coulomb
Unit Weight: 18 kN/m3
Cohesion: 0 kPa
Friction Angle: 21 degrees
Water Surface: Water Table
Custom Hu value: 1
Material: Allivium
Strength Type: Mohr-Coulomb
Unit Weight: 20 kN/m3
Cohesion: 0 kPa
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1
Material: ROCK
Strength Type: Mohr-Coulomb
Unit Weight: 20 kN/m3
Cohesion: 1000 kPa
Friction Angle: 30 degrees
Water Surface: Water Table
Custom Hu value: 1
1.492
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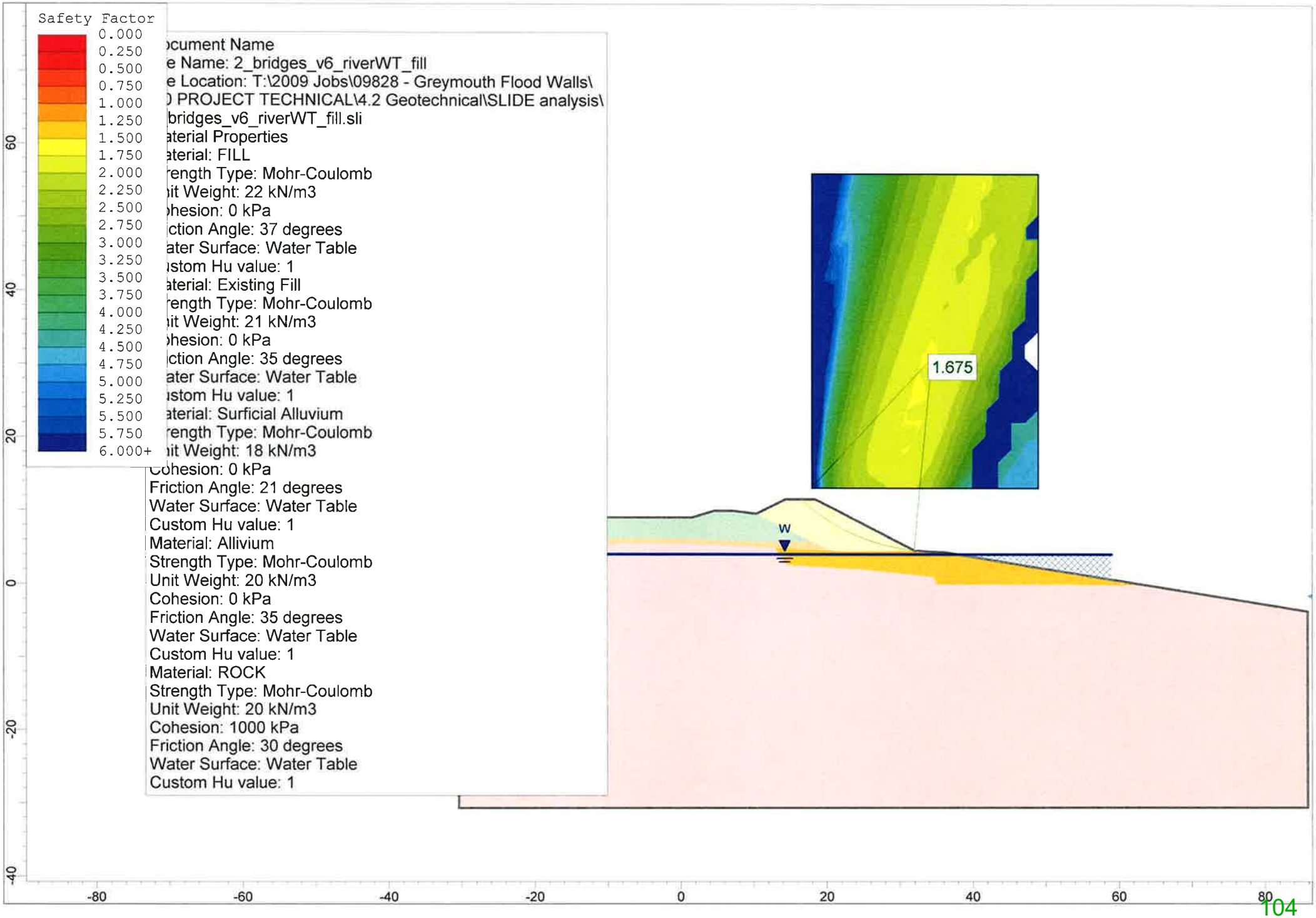
80
60
40
20
0
-20
-80
-60
-40
-20
0
20
40
60
80


Safety Factor
0.000
0.250
0.500
0.750
1.000
1.250
1.500
1.750
2.000
2.250
2.500
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3.000
3.250
3.500
3.750
4.000
4.250
4.500
4.750
5.000
5.250
5.500
5.750
6.000+
ocument Name
e Name: 2_bridges_v6_riverWT_fill
e Location: T:\2009 Jobs\09828 - Greymouth Flood Walls\
) PROJECT TECHNICAL\4.2 Geotechnical\SLIDE analysis\
bridges_v6_riverWT_fill.sli
aterial Properties
aterial: FILL
rength Type: Mohr-Coulomb
it Weight: 22 kN/m3
hesion: 0 kPa
ction Angle: 37 degrees
ater Surface: Water Table
stom Hu value: 1
aterial: Existing Fill
rength Type: Mohr-Coulomb
it Weight: 21 kN/m3
hesion: 0 kPa
ction Angle: 35 degrees
ater Surface: Water Table
stom Hu value: 1
aterial: Surficial Alluvium
rength Type: Mohr-Coulomb
it Weight: 18 kN/m3
Cohesion: 0 kPa
Friction Angle: 21 degrees
Water Surface: Water Table
Custom Hu value: 1
Material: Allivium
Strength Type: Mohr-Coulomb
Unit Weight: 20 kN/m3
Cohesion: 0 kPa
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1
Material: ROCK
Strength Type: Mohr-Coulomb
Unit Weight: 20 kN/m3
Cohesion: 1000 kPa
Friction Angle: 30 degrees
Water Surface: Water Table
Custom Hu value: 1
1.675
W
60
40
20
0
-20
-40
-80
-60
-40
-20
0
20
40
60
80

APPENDIX 5

Construction Specification Clauses

SECTION C: PROJECT SPECIFICATION

C.3 STOPBANK CONSTRUCTION – EARTHWORKS

C.3.1 SCOPE

This section of the specification covers:

- All earthworks for the stopbank raising inclusive of fill materials brought from off site.
- Preparation of ground surfaces for filling and concrete structures.
- Temporary drainage.

C.3.2 GROUND CONDITIONS

RILEY has completed a geotechnical investigation in new stopbank foundation areas and existing stopbanks where raising is to take place. The results of the ground investigation are presented in RILEY report 09828-A (attached). The contractor shall familiarise themselves with the contents of this report, which provides background information on soil types, groundwater and constructability aspects of the project.

C.3.3 EXCAVATIONS AND PREPARATION FOR FILL

This work consists of excavation below the stripped surfaces until suitable foundations for placement of fill materials is uncovered and includes:

- removal of materials within the stopbank footprint for areas of new stopbank,
- preparation of existing stopbanks for placement of additional fill,
- preparation of existing stopbanks for construction of concrete flood walls.

C.3.3.1 Clearing

All areas to be occupied by the permanent construction shall be cleared of all vegetation, such as grass, scrub, exposed roots, and any other organic material prior to stripping. Cleared materials shall be disposed of in dump areas to be designated by the Engineer.

C.3.3.2 Stripping

Stripping refers to the removal from all areas subject to excavation or filling, of all organic material remaining after clearing, i.e. topsoil, peat and humus. These materials shall be removed to expose soil or rock containing insignificant amounts of organic material.

All significant volumes of topsoil shall be stockpiled for later re-use. Materials containing insufficient amounts of topsoil for practical separation shall be disposed of in dump areas to be designated by the Engineer.

C.3.3.3 Drainage

All areas to be filled shall have effective surface drainage at all times. Temporary diversions or other suitable methods shall be utilised to keep surface and subsurface water away from the works area. All earthworks shall be carried out in the dry.

Any remedial work or extra excavation that could have been avoided by good drainage and sound earthwork practices shall be completed at no cost to the Principal.

C.3.3.4 New Stopbank Foundations

C.3.3.4 (a) General

New stopbanks will be constructed in the Goods Shed, 2-Bridges and Cobden areas. Geotechnical investigations indicate undercut to varying extents will be required to provide a suitable foundation of stopbank fill. Final undercut profiles will be determined by the Engineer on site. Prior to any filling, the stopbank footprint will be exposed and inspected by the Engineer. The Contractor shall be responsible for maintenance of the approved surface until filling commences.

(b) Goods Shed

The new stopbank section is located within a previously reclaimed goods loading area. Recently the area appears to have been used to stockpile coal. It is anticipated that at least 0.5 m of undercut will be required to remove the disturbed upper layer of fill, which contains coal fragments and other deleterious material.

(c) 2-Bridges

The new stopbank abuts the existing railway fill, and is located in an area of previously reclaimed riverbed. Geotechnical investigations indicate that 1 m to 3 m of fill overlies 1 m to 2 m of soft river sediment, which overlies 0 m to 2 m of dense granular river sediment, over bedrock. Where the new stopbank crest is to be more than 3 m above existing ground level, it is envisaged that the existing fill be removed along with the soft river sediment, and the stopbank founded on the underlying dense gravel. The deeper sub-excavations will be below the groundwater level (as well as the typical Grey River level), and Contractors shall also note extensive seepage occurs from the base of the rock bluff.

(d) Cobden

The new stopbank will be founded on top of the existing stopbank/road embankment. It is anticipated that no undercut will be required to obtain a suitable fill foundation; however the existing road pavement should be removed, along with all grass, topsoil and soft fill materials associated with the existing small stopbank adjacent to the road.

C.3.3.5 Preparation of Existing Stopbanks for Raising

Existing stopbanks to be raised by less than 200 mm shall be cleared of grass and/or vegetation along the crest, exposing topsoil free of grass, scrub, exposed roots, and any other organic material.

Existing stopbanks to be raised by more than 200 mm shall be cleared and stripped along the crest, exposing the underlying granular bank fill and low permeability river-side silty gravel capping layer.

C.3.3.6 Preparation for Concrete Flood Walls

This applies to the proposed concrete flood walls in the Mawhera Quay and Fisherman's Wharf areas. The walls are generally located on the river-side of the stopbank, with their foundation keying into the existing silty gravel zone identified in the geotechnical investigation.

The specified wall foundation cut shall be made to the river-side portion of the stopbank, exposing the silty gravel zone. If the silty gravel zone is not exposed, additional excavation will be directed. Testing shall be completed by the Contractor on the exposed silty gravel zone to confirm material type, consistency, density and moisture content. Scarifying, moisture conditioning, and compaction of the in situ soil may be directed by the Engineer depending on the results of testing.
If the additional excavation is more than 200 mm below the design wall foundation level for a significant length, compacted type 2 earth fill may be used to bring the foundation to design level.

C.3.4 FILL MATERIALS

C.3.4.1 General

The stopbank fill materials shall be obtained from borrow areas off site.

C.3.4.3 General Stopbank Fill (Type 1)

General stopbank fill shall be sourced off site. The material shall consist of a well graded sand/gravel mix conforming to the grading limits indicated in Table 1. The envelope is based on the envelope of tests on the existing stopbank material. In addition the d15 value shall be less than 0.7 mm to maintain filter compatibility with Type 1 material.

Table 1: Grading envelope for general stopbank fill (type 1 fill)

Particle Size (mm)	Percent Passing (%)
200	100
9.5	40 - 80
1.18	20 - 50
0.075	0 – 15

C.3.4.4 Low Permeability Fill (Type 2)

River-side low permeability fill (where specified) shall be sourced off site from an appropriate quarry or borrow area. The material shall consist of well graded silt, sand and gravel mix of low permeability(or a silt/ sand mixture ?). The envelope is based on the envelope of tests on the existing stopbank material. The particle size distribution after handling and placement shall conform to Table 2. If the material is produced by mixing two materials the contractor shall demonstrate to the Engineers satisfaction that effective mixing is obtained at all times. In locations where concrete structures will be in direct contact with type 2 fill (i.e. concrete flood walls) the maximum particle size shall be 20mm.

Table.2: Grading envelope for low permeability fill (type 2 fill)

Particle Size (mm)	Percent Passing (%) - General type 2 fill	Percent Passing (%) - Type 2 fill in contact with concrete structures
75	100	100
20	80 - 100	100
1.18	60 -100	60-100
0.075	35 - 85	35 - 85

C.3.4.6 Filter Cloth and Riprap

Riprap is specified in a separate section of this specification. However, the following points should be observed where riprap is specified over type 2 fill on new sections of stopbank, and adjacent to new sections of concrete floodwall.

Filter cloth shall be placed between riprap and the underlying soil to protect the stopbank fill and ensure it does not disperse into the riprap. Cloth joints shall be lapped 500 mm minimum. No material shall be permitted between the lapped sections of cloth. The cloth shall be placed without folds or wrinkles.

Where riprap abuts concrete structures, filter fabric shall be affixed to the concrete by battens or similar prior to placement of riprap. The fabric shall be in continuous contact with the underlying soil, requiring the overlying riprap to be sufficiently well graded to effectively hold it in place.

Riprap shall be placed in such a way that the underlying fabric is not damaged.

C.3.5 PLACEMENT AND COMPACTION OF FILL

C.3.5.1 General

Fill shall be placed to the lines and levels indicated on the drawings or otherwise instructed by the Engineer. The requirements for fill quality are specified in Section C.3.6.

Any material not complying with the specified requirements shall be removed at no cost to the Principal.

All bulk earthworks shall be carried out in fully drained conditions with no free water on the working surfaces. Cut and fill areas shall be sloped and graded adequately so that they do not pond stormwater, and drains shall be installed as necessary on a regular basis to deflect run off from the areas of operation or to drain ponded water as soon as ponds are seen to develop.

No fill shall be placed during periods of wet weather. In the event of fill operations ceasing in any area on account of wet weather or for more than two days for any reason, the Contractor shall obtain the Engineer's approval of the conditions of the fill surface before recommencing fill operations. The engineer may direct removal, conditioning or scarifying of all or part of the exposed sections of fill prior to earthworks resuming.

No new fill shall be placed over previously placed fill that has not achieved the required standard of compaction, has become contaminated, or has deteriorated from the required fill standards. Previously placed fill which does not comply shall be reinstated or removed at no cost to the Principal. Positive and effective drainage shall be maintained during filling operations to minimise deterioration of material exposed in the upper fill layers. Special care shall be taken to avoid hollows which could pond runoff.

The combined operations of spreading and compacting shall be undertaken using very systematic and properly managed procedures to the satisfaction of the Engineer, to ensure that the entire surface of each loose layer receives the specified minimum number of passes of the roller before further loose material is spread.

The specified minimum number of passes shall apply even if tests indicate the compaction requirements are met with fewer passes. Compaction of all material shall be carried out using specialised compacting equipment, separate from that used for transportation.

C.3.5.1 Placement and Compaction of Type 1 Fill

The fill shall be spread out in a uniform thickness layer. Loose layer thickness shall not exceed 200 mm.

Compaction of fill shall be carried out using a 10-tonne (static weight), smooth steel drum vibrating roller. Each fill layer shall be given at least four passes, even if compaction tests are met with fewer passes.

Where stopbank fill abuts sloping ground steeper than 18º (1V:3H), the natural ground or fill being filled against shall be keyed in. The horizontal width of the key shall be equal to the thickness of the compacted layer.

Prior to placement of the next lift, compaction tests in accordance with section 3.7 shall be carried out, and any areas found to be deficient repaired. All areas in which remediation of deficient fill has been necessary shall be re-tested in accordance with section 3.7 prior to additional fill being placed.

C.3.5.5 Acceptance Standards for Fill

General Fill (Type 1)

Deflection of the fill during a proof roll shall be less than 3 mm, and no weaving shall be permitted.

At the 2 Bridges location, type 1 fill shall also be subject to:

> Minimum of 95% of optimum dry density as obtained from a Standard Compaction Test, and
>
> maximum of 5% air voids averaged over 10 consecutive tests, and 7% on any one test.

Low Permeability Fill (Type 2)

> Minimum of 95% of optimum dry density as obtained from a Standard Compaction Test, and
>
> maximum of 5% air voids averaged over 10 consecutive tests, and 7% on any one test.

C.3.5.6 Unsuitable Material

Unsuitable material shall be placed removed from the site, and disposed of by the contractor.

C.3.5.7 Topsoil and Grassing

Topsoil shall be placed on all stopbank batters and crests that will not be otherwise surfaced (i.e. roads). Topsoil shall be free of stones and vegetation or roots. It shall be placed with a minimum thickness of 200 mm, and be compacted via track rolling. Grassing is covered in a separate section of this specification.

C.3.5.8 Tolerances and Profiles

The construction tolerances for the project are defined elsewhere, however in relation to the type 2 fill zone located on the river-side of the stopbank, the dimensions indicated on the drawings are minimum dimensions. The type 2 fill material is permitted to extend up to half the total stopbank width, with the final thickness to be nominated by the contractor on the basis of material costs and anticipated construction methodologies.

C.3.6 QUALITY CONTROL

The Contractor shall appoint an experienced full time earthworks supervisor, whose duties shall include the control of filling operations in accordance with this specification.

The Contractor shall undertake sufficient tests on site to become thoroughly familiar with fill types and behaviour under compaction, and satisfy himself that the compacted fill meets the specified requirements.

All material control tests shall be carried out and paid for by the Contractor.

The testing shall be carried out by an IANZ registered laboratory or their representative for the tests indicated. This shall include both laboratory and field testing. The results shall be supplied to the Engineer demonstrating compliance with this specification, at no less than every two weeks. Any non compliance shall be reported at the weekly meeting and actions taken. Formal results shall be provided to the Engineer for each monthly progress payment. Up to 10% payment over and above retentions will be withheld if this information is not provided, or is incomplete, accompanying the progress payment application, at the Engineer's discretion. The scope and frequency of testing can only be altered at the instruction of the Engineer.

If requested by the Engineer, testing shall be carried out in the full time presence of the Engineer or his representative.

At any location the Engineer may carry out his own tests at his discretion. If there is any discrepancy the Engineer's results shall prevail.

C.3.7 TESTING REQUIREMENTS

C.3.6.1 Compaction Testing

Control tests shall be carried out by the Contractor.

The fill compaction requirements and related tests are defined in Table 3 and the list of qualifying notes.

Table.3: Test methods

Test	Test Method and/or Test Description
Optimum moisture/density	Standard compaction test as per NZS 4402:1986
Air voids	As defined in NZS 4402:1986 and involving intermediate tests in situ density, water content and solid density below
In-situ density	NDM Method
Water content	NDM Method, with confirmatory laboratory tests as per NZS 4402:1986, Test 2.1
Solid density	NDM Method
Sieve analysis	NZS 4402:1986, Test 2.8.1

Note 1: In situ Density - The air voids content of the compacted soil at any test location shall be taken as the mean of the air voids results from a set of density tests. A set of density tests shall comprise two or more individual tests made within an area of 0.5 m².

The frequency of testing will depend on the consistency of the fill operations and materials. The testing rate will be generally as follows at the commencement of filling.

Table 4: Fill testing regime

Test	Material	Frequency
In situ moisture/ density (NDM method with laboratory moisture content)	Type 1 fill (at new 2 Bridges and Cobden stopbanks only) In situ silty gravel river-side face on existing stopbanks (at new concrete flood wall locations only) Type 2 fill	1 set per 1000 m^3 fill placed 1 set per 50 m length 1 set per lift over 50 m length
Standard Compaction test (Proctor Test)	Type 1 fill (specifically the material to be used at the 2 Bridges fill) Type 2 fill	2 sets prior to start of construction 2 sets prior to start of construction, 1 set per 500 m^3 thereafter
Sieve Analysis	Type 1 fill Type 2 fill	3 sets prior to start of construction, 1 set per 2,000 m^3 thereafter. 3 sets prior to start of construction, 1 set per 500 m^3 thereafter.

The Engineer may reduce or increase the frequency of testing as he judges appropriate, depending on the consistency of the results.

C.3.6.2Inspections and Approvals

The following critical points during construction must be inspected by the Engineer prior to further work being carried out in the area. No filling, concrete work, or quarry excavation for fill purposes shall commence without the Engineer's approval. All surfaces are to be surveyed for quantity measurement purposes. The Engineer must be informed at least 48 hours prior to the following hold points being reached, to ensure construction is not delayed.

Hold Points

- Inspection of each section of stripped, excavated and trimmed concrete floodwall foundation, prior to placement of concrete.
- For all sections of stopbank to be raised by more than 200 mm, inspection of each section of stripped, excavated and trimmed stopbank prior to placement of fill.
- Inspection of the prepared subgrade prior to placement of any fill at each of the Goods Shed, 2-Bridges and Cobden areas.
- At the 2-Bridges site, inspection of the installed culverts and their interfaces with the in situ rock and associated drainage works prior to backfilling.

Report to: Council	**Meeting Date:** 10 August 2021
Title of Item: Draft Asset Management Plans and Summary of LTP Rating District Consultation Topics	
Report by: James Bell – Engineering Officer, Sabrina Swensson – Business Support Officer	
Reviewed by: Randal Beal – Director of Operations	
Public excluded? No	

Report Purpose

The purpose of this paper is to provide Council with the background to the changes that have been made to the 2021 Asset Management Plans (AMPs) for the rating districts and provide a summary of the Rating District changes being consulted on through the LTP process.

Report Summary

Staff are proposing changes to the Asset Management Plans structure and content.
Changes to the Asset Management Plans;
The previous versions of the AMPs read as individual documents, the front sections have been combined with a single executive summary and overview. A glossary of terms has been added.

Other changes include:

- Franz Josef and Lower Waiho have been combined into one AMP
- Hokitika and Kaniere have been combined into one AMP
- New maps have been included
- Assets and asset values have been updated and asset maps included
- Damage exposure has been updated and has revised prudent reserves
- Works expenditure has been updated

The DRAFT individual rating district asset management plans can be found at;
Individual Special Rating Districts - The West Coast Regional Council (wcrc.govt.nz)

https://www.wcrc.govt.nz/services/special-rating-districts/special-rating-districts

Draft Recommendations

It is recommended that Council resolve to:

Note the proposed changes to the Asset Management Plans (AMP)

Issues and Discussion

Background

The Regional Council is required by the Local Government Act 2002 to prepare Asset Management Plans (AMP) for the protection of assets on our rating districts and to review these at least every three years. Each rating district has an AMP that describes how the council intends to manage the rating district on behalf of the affected community and sets out the history of the scheme so there is a record of the major decisions, including expenditure. It identifies the objectives of the scheme as well as the methods of monitoring the condition of the assets, determining the annual maintenance needed to retain the service level and the long-term planning and management goals that are taken into account when delivering the service.

Current situation

Council is consulting through the 2021/31 LTP on proposed changes to the Rating District AMP's content.

Implications/Risks

There are a number of proposed changes to improve the structure of the AMP's and provide more consistency for the Rating Districts including:

- Boundary changes
- Updated asset values

Views of affected parties

The views of the affected parties is being sought through the 2021/31 LTP consultation document.

Attachments

Nil

THE WEST COAST REGIONAL COUNCIL

To: Chairperson
West Coast Regional Council

I move that the public be excluded from the following parts of the proceedings of this meeting, namely, -

Agenda Item No. 8.

8.1 Confirmation of Confidential Minutes 13 July 2021

8.2 Adoption of Long Term Plan Consultation Document

8.3 Whitebait Fisheries Project

8.4 Rating Matters

8.5 Response to Presentation (if any)

8.6 In Committee Items to be Released to Media

Item No.	**General Subject of each matter to be considered**	**Reason for passing this resolution in relation to each matter**	**Ground(s) under section 7 of LGOIMA for the passing of this resolution.**
8.			
8.1	Confirmation of Confidential Minutes 13 July 2021		Clause 7 subclause 2 (a)
8.2	Adoption of Long Term Plan Consultation Document (to be circulated)		Clause 7 subclause 2 (a)
8.3	Whitebait Fisheries Project		Clause 7 subclause 2 (a)
8.4	Rating Matters		Clause 7 subclause 2 (a)
8.5	Response to Presentation (if any)		Clause 7 subclause 2 (i)
8.6	In Committee Items to be Released Media		Clause 7 subclause 2 (i)

I also move that:

- Heather Mabin
- Neil Selman
- Randal Beal
- Hadley Mills
- Colin Helem
- Nichola Costley

be permitted to remain at this meeting after the public has been excluded, because of their knowledge on the subject. This knowledge, which will be of assistance in relation to the matter to be discussed.

The Minutes Clerk also be permitted to remain at the meeting.

RESOURCE MANAGEMENT COMMITTEE

Resource Management Committee Meeting
(Te Huinga Tu)

A G E N D A
(Rarangi Take)

1. Welcome *(Haere mai)*

2. Apologies *(Nga Pa Pouri)*

3. Declarations of Interest

4. Public Forum, Petitions and Deputations *(He Huinga tuku korero)*

5. Confirmation of Minutes *(Whakau korero)* 13 July 2021

6. Chairman's Report

7. Planning and Operations Group

- Planning and Resource Science Report
- Submission on Natural and Built Environment Bill
- Te Tai o Poutini Plan Update

8. **Consents and Compliance Group**

- Consents Report
- Compliance Report
- Winter Grazing Report

9. **General Business**

H Mabin
Acting Chief Executive

THE WEST COAST REGIONAL COUNCIL

MINUTES OF THE MEETING OF THE RESOURCE MANAGEMENT COMMITTEE HELD ON 13 JULY 2021, AT THE OFFICES OF THE WEST COAST REGIONAL COUNCIL, 388 MAIN SOUTH ROAD, GREYMOUTH, COMMENCING AT 10.55.M.

PRESENT:

S. Challenger (Chairman), A. Birchfield, P. Ewen, D. Magner, B. Cummings, J. Hill, L. Coll McLauglin, J. Douglas, F. Tumahai

IN ATTENDANCE:

H. Mabin (Acting Chief Executive), J. Horrox (Science Team Leader), C. Helem (Acting Consents & Compliance Manager), N. Costley (Strategy & Communications Manager), L. Sadler (Planning Team Leader), J. Armstrong (Te Tai o Poutini Project Manager) via Zoom, N. Selman (Financial Consultant) via Zoom, T. Jellyman (Minutes Clerk), The Media.

WELCOME

Cr Challenger opened the meeting with a Karakia.

1. APOLOGIES

There were no apologies.

DECLARATION OF INTEREST

There were no declarations of interest.

PUBLIC FORUM, PETITIONS AND DEPUTATIONS

There was no public forum.

PRESENTATION

There was no presentation.

2. MINUTES

The Chairman asked the meeting if there were any changes to the minutes of the previous meeting.

Moved (Coll McLaughlin / Cummings) *that the minutes of the previous Resource Management Committee meeting dated 9 June 2021, be confirmed as correct, with the amendment of J. Armstrong's, and J. Douglas's apologies.*

Carried

Matters Arising

The Chairman advised that J. Armstrong was an apology for last month's meeting and H. Mabin spoke to the Te Tai o Poutini update in J. Armstrong's absence.
J. Douglas was also an apology for last month's meeting.

3. CHAIRMAN'S REPORT

Chairman Challenger stated that he attended various meetings with Chair Birchfield during the reporting period.

Moved (Birchfield / Coll McLaughlin) *that the verbal report is received.*

Carried

5. REPORTS

5.1 PLANNING AND OPERATIONS GROUP

5.1.1 PLANNING AND RESOURCE SCIENCE REPORT

J. Horrox spoke to this report in H. Mills absence. He reported that changes to the Lake Kini wetland boundary have been agreed upon.
J. Horrox outlined anticipated documents to be notified for submissions.
L. Sadler highlighted key points in the Export Draft of the Natural and Built Environments Bill and explained the submission process. She drew attention to the short timeframe for the processing of this submission. L. Sadler advised that a draft submission will be circulated by 26 July with feedback required by 30 July. She advised that a workshop could be held if requested by Council. Cr Coll McLauglin stated that she is very keen for a workshop. L. Sadler answered questions relating to the planning committee and the representatives on this committee, such as DoC, who might not have the level of understanding of and familiarity with Council issues as they work under different legislation. L. Sadler advised that DoC are usually a submitter and often an appellant and this could become a conflict of interest.
Cr Ewen congratulated L. Sadler for her work on this matter. L. Sadler responded that she would pass this onto to her staff.
It was agreed that a workshop would be arranged and a Zoom link included in the invitation. L. Sadler agreed to circulate the draft submission to the district councils, DoC and the Kotahitanga ki te Uru Alliance. It was noted that the timeframe is very tight.

Moved (Coll McLaughlin / Douglas)

It is recommended that the Resource Management Committee resolve to:

1. *Receive the report.*

2. *Make the changes to the Lake Kini scheduled wetlands boundaries on Māori reserve land (KAGP008a and KAGP008b) in the Regional Land and Water Plan operative on 20 July 2021.*

3. *Agree with the updated staff advice in Appendix 1 about which national documents to submit on.*

4. *Delegate authority to the Acting Chief Executive Officer to give final approval of the Council's submission on the Exposure Draft of the Natural and Built Environments Bill.*

Carried

5.1.2 TE TAI O POUTINI PLAN UPDATE

J. Armstrong spoke to her report and provided an update on the process with Significant Natural Areas (SNA's) and Outstanding Natural Landscapes (ONL's). She stated that where this is an ONL there is often a SNA there as well as they often overlay on top of each other. J. Armstrong offered to answer questions.
J. Armstrong explained noise contours to the meeting and advised that this information will be helpful going forward.
J. Armstrong provided information from Local Government New Zealand relating to accepting agenda papers. She stated that a paper can be accepted for discussion but that does not mean that governors are accepting or endorsing the content of the report.

Moved (Tumahai / Magner) *That the report is noted.*

Against Cr Ewen
Carried

5.1.3 TE TAI O POUTINI PLAN – ALTERNATE COMMITTEE MEMBER

J. Armstrong spoke to this report and advised that each of the district councils have already elected an alternate and it was suggested that this Council does the same. J. Armstrong advised that there is always a Zoom link for these meetings.
Nominations were called for. Cr Birchfield nominated Cr Ewen. Cr Ewen declined the nomination.
Cr Magner stated that it is a good idea to have an alternative to keep the momentum up.
It was noted that F. Tumahai is already on this committee. Cr Coll McLaughlin asked Cr Challenger if he was interested in view of him being the Deputy Chair and the Chair of the Resource Management Committee. Cr Magner noted the Cr Challenger has been on this committee previously. It was agreed that Cr Challenger would be the first alternate but if he is not available then another Councillor be able to attend the meeting.

Moved (Magner / Coll McLaughlin)

It is recommended that the Resource Management Committee resolve to:

That Cr Challenger is the alternate member to attend Te Tai o Poutini Plan Committee meetings if a permanent Committee member is unavailable, and if Cr Challenger is not available then another Councillor may attend.

Carried

5.2.1 CONSENTS MONTHLY REPORT

C. Helem spoke to this report and took it as read. He outlined various consenting matters and offered to answer questions.
C. Helem confirmed that Ross Moore Contracting Ltd has now had a consent variation granted to retrospectively authorise the disposal of demolition waste from Kingsgate Hotel demolition.
Cr Cummings stated that a NIWA report identified that the Punakaiki and Porarai Rivers as high risk for removing gravel from the lower sections of the river. He asked if this had been taken into account when granting a consent. C. Helem advised that the volumes are small and over a five-year term.
C. Helem answered questions from Councillors.

Moved (Hill / Tumahai) *That the June 2021 report of the Consents Group be received.*

Carried

5.2.2 COMPLIANCE & ENFORCEMENT MONTHLY REPORT

C. Helem spoke to this report and outlined compliance matters. He advised that compliance staff and resource science staff recently attended the sinking of a fishing vessel which is featured in his report.
C. Helem updated the meeting on previously reported complaints relating to demolition material from Grey Base Hospital and advised that the resource consent for this has now expired. He stated that the disposal of demolition material from Revingtons Hotel is still to be addressed.
C. Helem outlined enforcement matters.
He confirmed that demolition material from the old hospital is remaining on site at the moment.

Moved (Birchfield / Cummings)

1. *That the July report of the Compliance Group be received.*

2. *That the $5,000 bond for RC-2014-0110 Peter Savage is released.*

Carried

GENERAL BUSINESS

Cr Challenger advised that he has received a number of phone calls and inquiries about air quality in Hokitika. J. Horrox provided extensive information about what is currently in place for the monitoring of air quality in Reefton, and stated that other areas of the region are investigated for air quality and not just Reefton.
Cr Magner stated that she has also received verbal complaints about the smell of coal and air quality in Hokitika this week. J. Horrox advised that air quality monitoring was carried out all over the West Coast back in 1999 and 2001 and this revealed issues in various areas of the West Coast including Hokitika. It was noted that air quality issues relate to weather conditions and can be a problem in most small towns in the winter time. J. Horrox advised that an Envirolink project with NIWA is underway at the moment to try to help identify priority areas. Cr Cummings stated that this happens in most towns but only three or four times of year. Further discussion took place on possible monitoring devices that can be purchased. J. Horrox provided an extensive update on air quality monitoring in Reefton, he stated that Reefton had the highest levels of PM^{10} and therefore this is where the focus of resources has been. J. Horrox advised that good data in Reefton has been obtained so far this year.

Hazardous Waste
Cr Ewen raised the matter of hazardous waste on the West Coast. He stated that in view of recent demolition operations and the difficulty in disposing of demolition waste material, he suggested that the time may have come for a dump site on the West Coast. Cr Ewen noted that some of this hazardous waste could also contain asbestos.
Cr Ewen suggested that a discussion is held with West Coast politicians as there will be an increase in the coming years in view of the ongoing demolitions. Cr Ewen stated that at the moment a scatter gun approach has been taken with the disposal of hazardous waste on the West Coast. He gave the example of the problems encountered in getting rid of the demolition material from the hospital. Cr Ewen suggested that one site for the whole region would be beneficial. He stated that waste disposal needs to be done right and there are plenty of areas on the West Coast were this could be done without any adverse effects to communities. Cr Ewen stated that all West Coast Councils could work together to get this over the line, as this could become an income earner.
Cr Birchfield agreed and stated that there are a lot of buildings around Greymouth to come down as well as the finishing off of the demolition of the hospital. Cr Birchfield stated that there could be demand for a consented and well run facility.
It was agreed that this matter would be placed on the agenda at the next Mayors Chair's and Iwi forum.

The meeting closed at 11.42 a.m.

.....
Chairman

.....
Date

Report to: Resource Management Committee	**Meeting Date:** 10 August 2021
Title of Item: Planning and Resource Science Report	
Report by: Lillie Sadler, Planning Team Leader	
Reviewed by: Hadley Mills, Planning, Science and Innovation Manager	
Public excluded? No	

Report Purpose

To update the Committee on planning developments over the last month, and seek their agreement on the updated staff advice in Appendix 1.

Draft Recommendations

It is recommended that Council resolve to:

1. *Receive the report.*
2. *Agree with the updated staff advice in Appendix 1 about which national documents to submit on.*

Issues and Discussion

Lake Kini wetland boundary changes made operative

Changes to the Lake Kini wetland boundaries in the Land and Water Plan and the A3 set of maps which are now part of the Plan became operative on 20 July 2021.

Freshwater Implementation

Freshwater Management Unit (FMU) Groups' update:

Hokitika: The meeting that was scheduled for 20 July was postponed to 17 August due to staff being unavailable.

South Westland: The third workshop that was scheduled for 29 July was postponed to August. A date is yet to be confirmed.

Grey and Kawatiri: Revised Long Term Visions were circulated to these two FMU Groups. Staff await the Group's feedback.

Anticipated documents to be notified for submissions

The Table in Appendix 1 is updated based on recent updates from the Ministry for the Environment. Updated information is shown with underline.

Submission on Exposure Draft of Natural and Built Environments Bill

A draft submission has been prepared on the Exposure Draft of the Natural and Built Environments Bill, and when finalised it will be lodged on 4 August. To canvas views on the draft submission, a workshop was organised by Council staff on 27 July and attended by staff and elected representatives of Poutini Environmental Limited, the District Councils, Development West Coast and the Regional Council. Council staff also participated in a webinar with initial legal commentary on the Exposure Draft, and a regional council policy/planning staff workshop on it. At the time of writing this report, the main concerns with the Exposure Draft are:

1. As the primary replacement for the RMA, West Coast ratepayers are likely to pay heavily, and disproportionately, for the cost of change.
2. The fundamental principles of well-being embodied in the Local Government Act 2002, of social, economic and cultural impacts on West Coast communities, have not been adequately consulted on, nor have they been properly assessed or supported.
3. We agree with giving effect to the principles of Te Tiriti o Waitangi (the Treaty of Waitangi).
4. Te Reo terms can have different meanings amongst iwi and hapu.
5. In our view, the Exposure Draft erodes the Principles of Good Local Governance.
6. Oppose proposed membership of the Planning Committee.
7. Oppose central government requiring plan changes.
8. Lack of definition and clarity of terminology.
9. Important provisions like access to information, public participation in decision making, and access to justice in environmental matters are omitted or eroded.
10. The erosion of transparent public plan making processes, alternative dispute resolution and the right to a fair public hearing, erodes the rule of law.
11. Include an appeal process on points of law only.
12. Increased centralised decision-making waters down the role of local Councillors and local governance.
13. Compliance, monitoring and enforcement (CME) are not included, but play a crucial part in resource management at the local level.
14. Transitions are not included in the Exposure Draft to comment on; but they must be provided in the finalised Bill.

The draft submission is not attached as it is still being edited. A final draft will be circulated to the RMC prior to lodging. Once the submission is lodged, it will be made available on the Council's website.

Consultation on national freshwater regulation

The Government is seeking feedback on two Discussion Documents for a regulatory framework for freshwater farm plans, and changes to the stock exclusion low slope maps. These documents are being consulted on together as they relate to each other.

For the stock exclusion low slope map, feedback is sought on:

- a different mapping approach called 'local terrain averaging'
- altitude limits and removing tussock and depleted grassland from the map
- the balance between using the low slope map and freshwater farm plans for identifying areas for stock exclusion.

Feedback is also sought on the freshwater farm plan regulatory system through to implementation. The Discussion Document proposes to have outcomes that describe what each freshwater farm plan must demonstrate it will achieve, as well as requirements for content, certified assessment, audit, enforcement and reporting and review. Freshwater farm plans will be mandatory for all farms with 20 or more hectares of land in arable or pastoral use, or five or more hectares of the farm in horticultural land use. The regulations are expected to come into effect from mid-2022.

A third supporting document with an initial regulatory impact analysis of the proposed regulatory options for freshwater farm plans is also available.

Here are links to the Discussion Documents, and the initial regulatory impact analysis of freshwater farm plan regulations:

https://environment.govt.nz/news/feedback-sought-on-freshwater-farm-plans-and-low-slope-maps-for-stock-exclusion/

https://environment.govt.nz/assets/publications/freshwater-farm-plan-regulations-supporting-document.pdf

Feedback is invited up to 12 September 2021, and planning staff will seek input from Councillors, Poutini Ngāi Tahu, farmers, and compliance staff. As the closing date is prior to the September Resource Management Committee (RMC) meeting, a draft and final response will be circulated to the RMC on 27 August and 10 September respectively.

Resource Science

The following links show data visualisation for Reefton Winter air quality monitoring and hydrology flood alarm levels. There were no air quality exceedances in July, however there were multiple flood warning levels which triggered a Civil Defence response in the Buller District around 16-18 July. These can be viewed in the link below.

https://www.wcrc.govt.nz/environment/air

https://www.wcrc.govt.nz/services/flood-monitoring

Attachments

Appendix 1: Anticipated documents to be notified for submissions in 2021

Appendix 1: Anticipated documents to be notified for submissions in 2021

Document	Main points	Approximate period of notification for submissions	Recommendation to submit or not
Exposure Draft - Natural and Built Environments Bill	Purpose of the Bill is to enhance the quality of built and natural environments, for wellbeing of current and future generations, within environmental limits. Proposes outcomes, limits and targets, set in one plan for each region, prepared by local government and mana whenua. Exposure draft of the Bill will be developed for consideration by a select committee inquiry, except it will not be formally introduced into Parliament yet.	1 July – 4 August 2021	Staff recommend to make a submission, WCRC will need reasonable transitional provisions in the Bill to be able to get maximum benefit from current and upcoming plan reviews and changes prepared under the RMA. Main issues are likely to be: • the costs of changing all plans into one regional environmental plan • Social and economic implications of setting environmental protection limits in plans. • Stronger emphasis on environmental protection • Erosion of local decision-making on regional plans via a new plan committee structure.
Stock Exclusion Regulations: proposed changes to low slope map – Discussion Document; and Freshwater farm plan regulations - Discussion Document	Changes are proposed to the map showing low slope land, which is linked to the stock exclusion requirements. The current map includes areas of land that were not intended to be captured by the regulations. A regulatory framework for farm plans is also outlined, with the intent that farm plans will eventually be used in place of NESs, rules and consents to manage farm activities that can affect freshwater. It is proposed to include outcomes that describe what each freshwater farm plan must demonstrate it will achieve, as well as requirements for content, certified assessment, audit, enforcement and reporting and review. The Government is combining consultation on these two Discussion Documents.	12 Sept 2021 for both Discussion Documents	To be advised, but likely to recommend making a submission

Resource Management (Regional Responsibility for Certain Agricultural Matters) Amendment Bill	MP Mark Cameron's bill was drawn from the Parliamentary Member's bill ballot on 1 July 2021. The Bill seeks that regional councils do not have to prescribe some farming rules, including for intensive winter grazing, the application of synthetic nitrogen fertiliser to pastoral land, and sediment control measures. It also seeks to revoke the freshwater Stock Exclusion Regulations.	Not yet known	To be further advised in due course. This Bill was only recently introduced to Parliament for their consideration. It is yet to have its First Reading, where it will be debated and voted on. If successful, it is usually sent to a Select Committee to then go through a public submission process.
Proposed amendments to the National Environmental Standard for Sources of Human Drinking Water	MfE is considering proposed amendments to the National Environmental Standard for Sources of Human Drinking Water to strengthen how risks to source waters are considered in RMA decision making. These amendments are intended to work in tandem with provisions in the Water Services Bill to provide a proactive and preventative approach for managing risks to drinking water sources.	Public consultation is anticipated in August-September 2021	Staff to advise nearer the time whether to submit or not.
Future Local Government review	An independent review of local government will explore how councils can maintain and improve the well-being of New Zealanders in the communities they serve, long into the future.	No document to be released for submissions at this stage but by 30 September 2021, a report will go to the Minister signalling the probable direction of the review and key next steps	To be advised in due course
Natural and Built Environments Bill		Late 2021, aiming for it to come into force late 2022	Same as for the Exposure draft of the NBE Bill
Strategic Planning Bill	Provides for the development of long-term (30 yrs minimum) regional spatial strategies that integrate land-use planning, environmental regulation, infrastructure provision and climate change response. Mandates use of spatial planning.	Bill likely to be Introduced to Parliament in late 2021	Same as above

	Requires central govt, local govt, and mana whenua to work together to prepare a strategy.		
Managed Retreat & Climate Change Adaptation Bill	Will focus on the necessary steps to address effects of climate change and natural hazards. Will deal with complex legal and technical issues (e.g. liability and compensation) around managed retreat.	Consultation will likely occur in June and July 2021. Bill likely to be Introduced to Parliament in late 2021.	Same as above
Emissions Reduction Plan	Once the Commission has provided their final advice to the Government by 31 May 2021, Government will need to develop an emissions reduction plan by 31 December 2021 which sets out policies and strategies for meeting emissions budgets.	Likely to be the third quarter of 2021	
National Adaptation Plan	Work on the National Adaptation Plan (NAP) is underway, and will need to be completed by August 2022. The NAP will be an all of government strategy and action plan. The plan will guide action on climate change adaptation between 2022 and 2026 and will respond to and prepare for the risks in New Zealand's first climate change risk assessment.	To be confirmed	

Report to: Resource Management Committee	**Meeting Date: 10 August 2021**
Title of Item: Submission on Exposure Draft of Natural and Built Environments Bill	
Report by: Lillie Sadler, Planning Team Leader	
Reviewed by: Hadley Mills, Planning, Science and Innovation Manager	
Public excluded? No	

Report Purpose

To update the Committee on the Council's submission on the Exposure Draft of the Natural and Built Environments Bill.

Draft Recommendations

It is recommended that Council resolve to:

1. *Receive the report.*

Issues and Discussion

Background

In the Planning and Resource Science report for the August 2021 Resource Management Committee (RMC) meeting, there is an item about the Council's draft submission on the Exposure Draft of the Natural and Built Environments Bill. At the time that report was written, the submission was still in the draft stage and subject to change.

This report provides the Committee with a copy of the final submission that was lodged on 4 August.

Current situation

As well as incorporating feedback from the multi-party workshop on 27 July, the submission has been further amended to reflect feedback from senior management and Poutini Ngāi Tahu. Attached as Appendix 1 is a copy of the final submission. Key changes from the 23 July version of the draft submission that was circulated to the RMC include:

- Supporting the stronger wording in the Exposure Draft of "giving effect to" the principles of the Treaty of Waitangi, compared to "take into account" and "have regard to" in sections 7 and 8 of the RMA;
- Highlighting the positive aspects of the Te Tai o Poutini Plan (One District Plan – TTPP) Governance Committee structure, and recommending that this planning committee model be adopted in the new Bill;
- Highlighting the West Coast Mana Whakahono ā Rohe Participation Arrangement as a good example of the Council and iwi partners' ongoing good working relationship into the future; and
- Separating, shortening and refocussing some of the main points.

Substantial changes were also made to the following main concerns and recommendations:

1. **As the primary replacement for the RMA, ratepayers are likely to pay heavily for the cost of change.**

Recommendation 1

The WCRC seeks that the Government:

a) slows down the reform process;
b) engages in meaningful consultation with local government and communities, funded by the Crown;

c) incorporates as much of the effective RMA provisions as possible into the new Bill; and
d) retains relevant caselaw.

2. In providing for environmental protection and the social, economic and cultural well-being of local communities, regional differences must also be provided for.

Recommendation 2

a) Provide for regional differences when setting environmental limits to protect the natural environment, and provide for current and future generation's wellbeing.
b) The Council supports the use of qualitative and quantitative methods to set environmental limits and the use of mātauranga Māori to set limits. Regional limits must be set in partnership with iwi.
c) We are aware that mahinga kai is fundamental to the identity and wellbeing of Ngāi Tahu whānui. We seek that the environmental limits prescribed and environmental outcomes must include mahinga kai.

5. Giving effect to Te Tiriti o Waitangi (the Treaty of Waitangi).

Recommendation 5

a) We support the requirement to give effect to Te Tiriti (as opposed to take it into account). The Council agrees and supports Te Tiriti clause as provided for under the Exposure Draft as a positive step towards Te Tiriti o Waitangi partnership and co-operation. However, it must be stressed that compliance with Te Tiriti cannot be achieved through one clause alone. Tiriti partnership needs to be integrated throughout the Bill.
b) We seek that the Mana Whakahono ā Rohe provisions in the RMA are retained in the new law.

The Grey and Westland District Councils indicated their support for the submission, and their signatures have been added to the covering letter.

Attachments

Appendix 1: West Coast Council's Submission on the Exposure Draft of the Natural and Built Environments Bill, and the Parliamentary Paper.

THE WEST COAST
REGIONAL COUNCIL

388 Main South Rd, Paroa
P.O. Box 66, Greymouth 7840
The West Coast, New Zealand
Telephone (03) 768 0466
Toll free 0508 800 118
Facsimile (03) 768 7133
Email info@wcrc.govt.nz
www.wcrc.govt.nz

WESTLAND DISTRICT COUNCIL

MĀWHERA
GREY
DISTRICT COUNCIL

4 August 2021

Committee Secretariat
Environment Committee
Parliament Buildings
Wellington

Phone:04 817 9520
en@parliament.govt.nz

Dear Sir/Madam

Submission on the Exposure Draft: Natural and Built Environments Bill and Parliamentary Paper

Thank you for the opportunity to make a submission to the "Inquiry on the Natural and Built Environments Bill: Parliamentary Paper", which incorporates an Exposure Draft of the Natural and Built Environments Bill and supporting explanatory material. The West Coast Regional Council (WCRC or Council) values this additional opportunity to have input into development of the Bill.

Please find the West Coast Regional Council's submission attached. Please note that the Grey District Council supports this submission.

The Council supports some aspects of the Exposure Draft, for instance, the provisions relating to giving effect to the principles of the Treaty of Waitangi and combining district plans. These are already being implemented in the West Coast region via the Mana Whakahono ā Rohe Participation Arrangement between Council and iwi (Poutini Ngāi Tahu), and the current preparation of Te Tai o Poutini Plan (One District Plan - TTPP) for the three District Councils.

We also have several concerns and questions about the Exposure Draft and its rationale in the Parliamentary Paper, including costs to ratepayers, rate of change, providing for regional differences, erosion of local democratic input, and the structure of the planning committee.

We would further like to advise that the Te Tai o Poutini Plan Governance Committee (committee structure and membership) is working well, and we recommend that this planning committee model be adopted in the new Bill.

Our contact details for service are:

Lillie Sadler
Planning Team Leader
West Coast Regional Council
PO Box 66
Greymouth 7840
Phone: 021 190 6676
Email: ls@wcrc.govt.nz

We would be grateful for acknowledgement of receipt of our written submission.

Yours faithfully

Heather Mabin
Acting Chief Executive Officer

Tanya Gibson
Mayor, Grey District Council

Simon Bastion
Chief Executive Officer
Westland District Council

Executive Summary

1. As the primary replacement for the RMA, ratepayers are likely to pay heavily for the cost of change.

Recommendation 1

The WCRC seeks that the Government:

a) slows down the reform process;
b) engages in meaningful consultation with local government and communities, funded by the Crown;
c) incorporates as much of the effective RMA provisions as possible into the new Bill; and
d) retains relevant caselaw.

2. In providing for environmental protection and the social, economic and cultural well-being of local communities, regional differences must also be provided for.

Recommendation 2

a) Provide for regional differences when setting environmental limits to protect the natural environment, and provide for current and future generation's wellbeing.
b) The Council supports the use of qualitative and quantitative methods to set environmental limits and the use of mātauranga Māori to set limits. Regional limits must be set in partnership with iwi.
c) We are aware that mahinga kai is fundamental to the identity and wellbeing of Ngāi Tahu whānui. We seek that the environmental limits prescribed and environmental outcomes must include mahinga kai.

3. Lack of definition and clarity of terminology.

Recommendation 3

a) Define common terms commonly, to avoid them being contested in court. Include a comprehensive interpretation section and apply it consistently.
b) Ensure that offsetting and compensation are provided for in the Natural and Built Environments Act (NBA), as part of the effects management hierarchy.

4. In our view, the Exposure Draft erodes the Principles of Good Local Governance.

Recommendation 4

Ensure there are provisions in the NBA for good local governance and representation in plan-making and decision-making processes, including that the selection of an independent chair for the planning committee must be done by the councils and local iwi.

5. Giving effect to Te Tiriti o Waitangi (the Treaty of Waitangi).

Recommendation 5

a) We support the requirement to give effect to Te Tiriti (as opposed to take it into account). The Council agrees and supports Te Tiriti clause as provided for under the Exposure Draft as a positive step towards Te Tiriti o Waitangi partnership and co-operation. However, it must be stressed that compliance with Te Tiriti cannot be achieved through one clause alone. Tiriti partnership needs to be integrated throughout the Bill.
b) We seek that the Mana Whakahono ā Rohe provisions in the RMA are retained in the new law.

6. Te Reo terms can have different meanings amongst iwi and hapū.

Recommendation 6

We support the general intention of Te Oranga o te Taiao, however recommend that the NBA should qualify that this general definition is subject to the right of iwi, papatipu rūnanga and hapū to interpret the meaning of Te Oranga o te Taiao in their rohe.

7. Oppose proposed membership and structure of the Planning Committee.

Recommendation 7

a) We strongly suggest an alternative structure for the proposed Planning Committee that has:
   i. An expert advisory panel who can provide advice to the Committee on respective matters as and when needed, including a Department of Conservation (DoC) representative if the matter relates to the coastal marine area;
   ii. No DoC representative on the Planning Committee;
   iii. Two people per council; and
   iv. Representation is reflective of iwi as the Treaty Partner within their respective takiwā.
b) Additionally, all Committee members should be remunerated, preferably by central government.

8. Oppose central government requiring plan changes.

Recommendation 8

If this provision is carried over into the Bill, it must have some criteria or reasons for when a plan change may be required by central government, including that the respective council agrees that a plan change is necessary.

9. Important provisions like access to information, public participation in decision making, and access to justice in environmental matters are omitted or eroded.

Recommendation 9

Incorporate provisions for access to information, public participation in decision making, and access to justice in environmental matters in the Bill.

10. The erosion of transparent public plan making processes, alternative dispute resolution and the right to a fair public hearing, erodes the rule of law.

Recommendation 10

Uphold the rule of law, incorporate a transparent planning process, the right to a fair hearing, and use of Alternative Dispute Resolution in the NBA.

11. Include an appeal process on points of law only.

Recommendation 11

Provide for an appeals process on points of law only.

12. Increased centralised decision-making waters down the role of local Councillors and local governance.

Recommendation 12

Avoid erosion of local democracy, and ensure the NBA provides for local decision-making by implementing our submission Recommendations 4, 5, 6, and 7.

13. Compliance, monitoring and enforcement (CME) are not included, but play a crucial part in resource management at the local level.

Recommendation 13

a) Retain CME functions as core responsibilities of local authorities.

b) Strengthen boundaries between governance and operations, including, for example, codes of ethics and guidelines regarding responding to conflicts of interest from elected officials.

14. Transitions are not included in the Exposure Draft to comment on; but they must be provided in the finalised Bill.

Recommendation 14

Ensure that the timeframe for transiting from the RMA to the NBA is a minimum of 10 years, and provision is made for small interim plan changes to be undertaken.

Introduction

The Inquiry on the Natural and Built Environments Bill: Parliamentary Paper, with no date but modified on 2 July 2021 and re-released on 5 July 2021, states *"The purpose of the inquiry is to provide feedback on the extent to which the provisions in the exposure draft of the Natural and Built Environments Bill will support the resource management reform objectives, paying particular attention to improving system efficiency and effectiveness, and reducing complexity, while retaining appropriate local democratic input."*

The resource management reform objectives are:

"a) protect and where necessary restore the natural environment, including its capacity to provide for the well-being of present and future generations;
b) better enable development within environmental biophysical limits including a significant improvement in housing supply, affordability and choice, and timely provision of appropriate infrastructure, including social infrastructure;
c) give effect to the principles of Te Tiriti o Waitangi and provide greater recognition of te ao Māori, including mātauranga Māori;
d) better prepare for adapting to climate change and risks from natural hazards, and better mitigate emissions contributing to climate change; and
e) improve system efficiency and effectiveness, and reduce complexity, while retaining appropriate local democratic input."

The Council supports some aspects of the Exposure Draft, for instance, giving effect to the principles of the Treaty of Waitangi, and combining district plans. These are already being implemented in the West Coast region via the Mana Whakahono ā Rohe Participation Arrangement between Council and iwi, and the Te Tai o Poutini Plan (One District Plan) for the three District Councils.

While supportive of Clause 6 which requires giving effect to the principles of Te Tiriti o Waitangi, the Council has concerns that some of the other provisions in the Exposure Draft of the Natural and Built Environments Bill (Exposure Draft), may not support the resource management reform objectives.

While the RMA may not have lived up to expectations, we have a number of concerns and questions about implementing the Exposure Draft and Bill, including how much of the current RMA that is working well will be included as is in the new Bill. The Exposure Draft and its gaps leave considerable uncertainty. Resource management law and associated processes may not be perfect, but they do provide a solid base on which to build and go forward.

Our chief concerns with the Exposure Draft and Parliamentary Paper are elaborated on below and supported by a series of suggestions and recommendations. They are not listed in any order of priority.

About the Submitter

The West Coast region covers a vast area: it extends from Kahurangi Point in the north and as far south as Awarua Point, a distance of 600 kilometres. It is a region of great beauty and vast natural resources. It also has a low population and is predominantly rural. Approximately 84% of land area is in the Conservation Estate and 1% is under Land information New Zealand (LINZ) administration.

The Regional Council works closely with the regions' three territorial authorities (these being Buller, Grey and Westland District Councils). All four councils and iwi are working in partnership on developing one district plan for the three Districts, the Te Tai o Poutini Plan (TTPPP).

Outside of the main towns of Westport, Greymouth and Hokitika, the region's population is spread across smaller settlements and rural communities. It is important that reform decisions consider their respective social, economic, and cultural rights.

Poutini Ngāi Tahu are the tangata whenua of Te Tai o Poutini (the West Coast). We have a Mana Whakahono ā Rohe (Resource Management Act - Iwi Participation Arrangement) which captures the intent of the Council and Poutini Ngāi Tahu to continue to progress our strong relationship in accordance with the Treaty of Waitangi partnership between iwi and the Crown. We seek that the West Coast's Mana Whakahono ā Rohe Agreement is included and given weight in the new NBA.

Key Issues Raised by this Submission

1. As the primary replacement for the RMA, ratepayers are likely to pay heavily for the cost of change.

"30 As the primary replacement for the RMA, the NBA will address the most significant weaknesses in the current RM system." (Parliamentary Paper – NBA Exposure Draft pg.15)

A founding tenet of natural resource management is that all communities are responsible for addressing environmental damage but not all are equally responsible. These changes imposed by central government will have ratepayers paying for the cost of change, especially if it is large or complex, and the implementation thereof, but the authorisation has come down from Central Government without the consent of ratepayers, and without an opportunity for engaging in a genuine and meaningful way.

Building on a wealth of local government expertise harnessed in environmental and natural resources policy over thirty years is a logical approach. Ratepayers have already paid for testing the RMA over the last 30 years. If the RMA is virtually completely replaced, the knowledge and experience (and investment) gained from this testing will be lost. In our view, successes in natural resource management need to be strengthened and areas for improvement improved.

We continue to value the fundamental principle of sustainable management as enabling people and communities to provide for their social, economic, and cultural well-being and for their health and safety. Sustainable management should be promoted and improved, not removed. There is no evidence that the proposed reform will improve the economic, environmental, social or cultural wellbeing, or health and safety, of those on the West Coast. By not providing for these fundamental rights, the reform is likely to have a detrimental impact on these rights.

Further, we are concerned that the speed at which such a significant change to resource management law is being undertaken means there is a reduced opportunity for the public to be involved in the change process. Slowing down the reform process, engaging in meaningful dialogue with local government, funded by the Crown, and undertaking a more thorough review of the RMA and caselaw, are crucial.

We believe several of the proposed reforms are inconsistent with the Bill of Rights Act 1990, and the Treaty of Waitangi, and thereby oblige the Attorney-General to report this inconsistency to the House. Even a perception of inconsistency requires a separate procedure to be established so that the rights of local communities are effectively heard. The proposed reform potentially undermines social, economic and cultural rights, and therefore requires proper disclosure to the House.

Recommendation 1

The WCRC seeks that the Government:

e) slows down the reform process;
f) engages in meaningful consultation with local government and communities, funded by the Crown;
g) incorporates as much of the effective RMA provisions as possible into the new Bill; and
h) retains relevant caselaw.

2. In providing for environmental protection and the social, economic and cultural well-being of local communities, regional differences must also be provided for.

One of the fundamental rights for New Zealanders embodied in the Local Government Act 2002 is the need for Council's to consider the current and future well-being of all communities. Balancing this, we also agree with protecting and, where necessary, restoring the natural environment, including its capacity to provide for the well-being of present and future generations. For example, the West Coast Regional Policy Statement (RPS) Chapter on Indigenous Biodiversity and Ecosystems has a policy framework with bottom lines for managing development impacts on indigenous biodiversity. These targets include not making any species extinct, and not having an outcome of moving an endangered species to a greater threat classification.

The West Coast RPS provisions are appropriate for the West Coast context of relatively high levels of indigenous biodiversity, but may not be appropriate in other regions. For example, a new subdivision may be needed to meet the housing needs of local communities whose homes are destroyed by flooding but this development may displace one weka. Weka are quite common on the West Coast and not a rare species. In light of the RPS, the application could therefore be approved. If not, human rights would be undermined, and adverse economic and social impacts would be unreasonably stringent on the West Coast. Conversely, for a city subdivision on the rural fringes, displacing a single weka may have a potentially larger impact as weka are rarer in more densely built-up environments. Displacing one weka on the West Coast will not have a severe ecological impact on the West Coast but it could have different impacts up in Hamilton. Environmental limits need to recognise regional variations.

We agree in principle with better enabling development within environmental biophysical limits. However, it is unclear how the Exposure Draft will provide practical limits for every aspect of the natural environment. For example, freshwater and indigenous biodiversity issues differ between regions, and 'one-size' of regulation does not fit all regions. How will limits deal with changes over time, and local nuances? Care needs to be taken with drafting such limits, to ensure that they are relevant, appropriate for each region, and recognise that there are differences between some regions.

We have consulted with our iwi partners on the Exposure Draft, and Poutini Ngāi Tahu seek that mātauranga Māori be used to set environmental limits. Regional limits must be set in partnership with iwi. The Council supports these.

We are aware that mahinga kai is fundamental to the identity and wellbeing of Ngāi Tahu whānui. Poutini Ngāi Tahu seek that the prescribed environmental limits and environmental outcomes must include mahinga kai. The Council also supports this.

Limiting the types of plan rules for resource use, for example, to permitted and prohibited, will not be helpful for providing for regional differences. The Parliamentary Paper states that: *"More comprehensive plans will also help address conflicts between different outcomes; for example, classifying more activities as either 'permitted', or 'prohibited' in NBA"* [Proposed Natural and Built Environments Act] *plans or national direction"* [para 122]. Only having permitted and prohibited rules is too narrow, and it seems to contradict the effects management hierarchy. We do not support removing controlled, restricted discretionary and discretionary activity rule statuses, and question why the Government is considering this.

As provisions for environmental protection are given greater weight than economic, social and cultural well-being in the Exposure Draft, will this have the effect of more consents being declined, or more activities being prohibited, in order to achieve a more protected environmental status? The Parliamentary Paper does not address the impact that 'closing up of natural resources' will have on the West Coast's economic, social and cultural well-being. The Government will need to have a robust economic, social and cultural impact assessment done on how a more protective environmental framework will affect the economic, social and cultural wellbeing of people and communities.

Recommendation 2

a) Provide for regional differences when setting environmental limits to protect the natural environment, and provide for current and future generation's wellbeing.
b) The Council supports the use of qualitative and quantitative methods to set environmental limits and the use of mātauranga Māori to set limits. Regional limits must be set in partnership with iwi.
c) We are aware that mahinga kai is fundamental to the identity and wellbeing of Ngāi Tahu whānui. We seek that the environmental limits prescribed and environmental outcomes must include mahinga kai.

3. Lack of definition and clarity of terminology.

The Exposure Draft both fails to define and inform the terminology embodied in the Draft and omits terms already used in the RMA and referred to in legal precedence. What do terms like 'protect', 'restore', and 'improve' mean when large areas of the natural environment on the West Coast, for example, are already 'pristine'? Why is water in a pipe not water? (Note that the Government redefines the meaning of 'water' in the Exposure Draft). What is 'ecological integrity'? And why is 'offset' and 'compensation' redefined as to 'avoid, remedy and mitigate'? One important feature of good drafting is to make the law as understandable and accessible as is practicable.

New terms in the Bill will need testing, likely through the Courts. This will be especially so if there is no clarity in the Bill. This means that councils will have to pay for it in the Court if the terms are not clear in the law.

The Exposure Draft retains the effects management hierarchy but redefines "mitigation" to include offsetting and compensation. Caselaw indicates there is a difference between "mitigation" and offsetting and compensation. Changing the definition of "mitigation" overrides caselaw which has been developed over the last 30 years. Additionally, considerable work has been done to improve guidance on how to use offsetting and compensation tools. It would be a waste of good technical knowledge and experience to change them in the new framework.

Recommendation 3

a) Define common terms commonly, to avoid them being contested in court. Include a comprehensive interpretation section and apply it consistently.
b) Ensure that offsetting and compensation are provided for in the NBA, as part of the effects management hierarchy.

4. In our view, the Exposure Draft erodes the Principles of Good Local Governance.

In its current form, the Parliamentary Paper erodes fundamental principles of Good Governance. For instance, the Proposed Planning Committee is undemocratic, breaches professional ethics, and manifests a conflict of interests.

The Government explains:

- *"A planning committee is responsible for preparing the NBA plan in each region, following a specified process, which is not included in the exposure draft" [para 183 of the Parliamentary Paper]. "In contrast to the RMA, decisions relating to plan-making and development, including the approval or rejection of submissions, will be made by the planning committee for the region rather than solely by local authorities"* [para 180 of the Parliamentary Paper]. In other words, the Planning Committee will make the law.

- "*The key functions for a planning committee are to make and maintain a plan, approve or reject submissions from an IHP [Independent Hearings Panel] and set environmental limits, where authorised by the NPF"* [para 207 of the Parliamentary Paper]. The Planning Committee will interpret the law, decide on the law and not be accountable to the law.

This entire structure erodes the founding tenets of the 'separation of powers' whereby those who make the law do not rule on it. At present, local authority staff draft plans, the Chair of hearings is [preferably] judicially independent and Elected Local Councillors serve as an executive scrutinising process, setting policies, making regulatory decisions, reviewing council performance through the annual reporting process, and ensuring prudent stewardship and the efficient and effective use of their resources, in the interests of the district or region the council represents.

The proposed structure of the Planning Committee could further diminish the influence of democratically accountable bodies and could potentially result in counterproductive outcomes for individual communities, tangata whenua and Te Whenua.

In terms of governance, instead of holding elected members accountable for developing planning frameworks and resultant plans, a planning committee will make juridical decisions on the legal and policy framework, plans and their implementation for all people and communities in respective regions. In addition to governance, this governance committee will also busy itself amongst other things by setting scientific limits for the region. With all due respect, we question whether district council representatives on the planning committee will have the knowledge and expertise to decide on regional natural resource management issues, and vice versa.

It is unclear in the Exposure Draft who appoints the Committee chair, and how the committee is set up. Appointment of the chair must have democratic local authority and local iwi involvement, it should not be imposed at the national level.

If there is to be a planning committee in the final NBA, given the anticipated transitional time constraints with developing or amending plans, the planning committee arrangement needs to be a lot more pragmatic and flexible. The NBA also needs to provide for full reviews and plan changes to be done in stages.

Recommendation 4
Ensure there are provisions in the NBA for good local governance and representation in plan-making and decision-making processes, including that the selection of an independent chair for the planning committee must be done by the councils and local iwi.

5. Giving effect to Te Tiriti o Waitangi (the Treaty of Waitangi).

"39 The NBA intends to improve recognition of te ao Māori and Te Tiriti o Waitangi...."
(Parliamentary Paper – NBA Exposure Draft, pg.16).

We acknowledge legal principles as legal norms and agree with 'giving effect' to the principles of Te Tiriti o Waitangi (the Treaty of Waitangi). "*Give effect to the principles*" in clause 6 of the Exposure Draft is stronger wording than "*Have regard to*" in clause 8 of the RMA. We agree with this.

However, we disagree with the demotion of the Treaty of Waitangi and the exclusion of it from the fundamental purpose (clause 5) and principles (clause 18) of the Exposure Draft. We consider that compliance with Te Tiriti cannot be achieved through one clause alone. Tiriti partnership needs to be integrated throughout the Bill.

The Exposure Draft appears to erode the West Coast's local democracy as established by our Mana Whakahono ā Rohe Participation Arrangement. The Exposure Draft erodes the decisions of democratically elected Regional Councillors and our Poutini Ngāi Tahu partners. The WCRC's Resource Management Committee has a representative from each of the two West Coast Rūnanga (Te Rūnanga o Ngāti Waewae and Te Rūnanga o Makaawhio), with decision-making roles. In the absence of due process, the Exposure Draft takes responsibility away from our Councillors and Poutini Ngāi Tahu and gives it to others. In our view, this approach is inconsistent with the Treaty of Waitangi and therefore erodes fundamental principles of the Treaty.

The Mana Whakahono ā Rohe Participation Arrangement has been in place since October 2020. We seek that the West Coast's Mana Whakahono ā Rohe Agreement is retained in the new law.

Kōrero is important in tikanga. On a separate but important point, we also feel that requiring written submissions only and not facilitating an opportunity for dialogue and oral submissions erodes the principles of the Treaty. We do not agree with the view put forward in the Parliamentary Paper, that efficiency in NBA plan development and content, for example, requires *"written submissions rather than oral*". (Parliamentary Paper, Appendix 2, pg 81).

Recommendation 5
a) We support the requirement to give effect to Te Tiriti (as opposed to take it into account). The Council agrees and supports Te Tiriti clause as provided for under the Exposure Draft as a positive step towards Te Tiriti o Waitangi partnership and co-operation. However, it must be stressed that compliance with Te Tiriti cannot be achieved through one clause alone. Tiriti partnership needs to be integrated throughout the Bill.
b) We seek that the Mana Whakahono ā Rohe provisions in the RMA are retained in the new law.

6. Te Reo terms can have different meanings amongst iwi and hapū.

"39 The NBA intends to improve recognition of te ao Māori and Te Tiriti o Waitangi...."
(Parliamentary Paper – NBA Exposure Draft, pg.16).

Council's iwi partner, Poutini Ngāi Tahu, supports the general intention of Te Oranga o te Taiao, however recommend that the NBA should qualify that this general definition is subject to the right of iwi, papatipu rūnanga and hapū to interpret the meaning of Te Oranga o te Taiao in their rohe.

Recommendation 6
We support the general intention of Te Oranga o te Taiao, however recommend that the NBA should qualify that this general definition is subject to the right of iwi, papatipu rūnanga and hapū to interpret the meaning of Te Oranga o te Taiao in their rohe.

7. Oppose proposed membership and structure of the Planning Committee.

The Exposure Draft proposes that a Department of Conservation (DoC0 representative is on the Planning Committee. If there is to be a Planning Committee in the final NBA, having a DoC representative on the proposed Planning Committee is not supported by the Council.

Inclusion of Doc on the Planning Committee may create a conflict of interest as DoC representatives are regular submitters and appellants on Council plans, so they cannot be on the Planning Committee. If they are to be on the Planning Committee, then they cannot submit, and the Conservation Act will be undermined.

DoC operates under an entirely different mandate - the Conservation Act. We questions how DoC will be able to understand the issues for councils and ratepayers under resource management legislation that is supposed to provide, amongst other, for sustainable use and protection.

It is also unclear whether the DoC representative would be acting on behalf of national conservation interests, or local interests. The promotion of national conservation interests may not necessarily reflect local conservation matters.

Council questions why it is proposed to have a DoC representative on the planning committee. The problem is that they would reflect national interests and their input needs to be from the local level.

We suggest that instead of having a DoC representative on the Planning Committee, that a DoC representative be on an expert advisory panel, with other experts who can provide advice to the Committee on respective matters as and when needed. We consider that it is not appropriate to have DoC at the decision-making level on regional and district resource management matters (with the potential exception of their role in the coastal marine area under the New Zealand Coastal Policy Statement). Their role in an advisory capacity would be much more appropriate.

In terms of local authority representation, we disagree with having one person nominated by each local authority within the region. We consider that one person per council is not enough. The Te Tai o Poutini Plan (One District Plan) Governance Committee has two members per council, one mana whenua representative for each of the two Poutini Ngāi Tahu Rūnanga, and an independent chair. Council recommends that having two members per council is beneficial if one of them is overloaded

with other work, and where one representative might understand an issue better than the other representative. The Governance Committee's mandate also importantly provides for one proxy to stand in for a Committee member if the original member cannot attend a meeting. This helps to spread the workload.

Developing a combined District Plan is a big piece of work and it places heavy demands on the Governance Committee. Our experience is that having two representatives per Council in this structure is working well.

Recommendation 7

a) We strongly suggest an alternative structure for the proposed Planning Committee that has:
   i. An expert advisory panel who can provide advice to the Committee on respective matters as and when needed, including a Department of Conservation (DoC) representative if the matter relates to the coastal marine area;
   ii. No DoC representative on the Planning Committee;
   iii. Two people per council; and
   iv. Representation is reflective of iwi as the Treaty Partner within their respective takiwā.
b) Additionally, all Committee members should be remunerated, preferably by central government.

8. Oppose central government requiring plan changes.

Clause 15(2)(a) of the Exposure Draft provides that central government can require local councils to undertake a plan change, but there is no detail or qualifiers around the circumstances of when this would be required, or the scale or scope of such plan changes. The proposed approach is an 'open book', and there is the potential for central government to require substantial changes or multiple small changes, with no requirement to consider the economic impact on ratepayer communities of having to fund such changes. If this provision is carried over into the Bill, it must have some criteria for when a plan change may be required by central government. Some central government funding will need to be provided for small councils with limited resources if this is to proceed.

Recommendation 8

If this provision is carried over into the Bill, it must have some criteria or reasons for when a plan change may be required by central government, including that the respective council agrees that a plan change is necessary.

9. Important provisions like access to information, public participation in decision making, and access to justice in environmental matters are omitted or eroded.

Implementation provisions that contribute to the protection of the right of every person of present and future generations to live in an environment adequate to his or her health and well-being are beneficial.

Everyone should have the right to receive environmental information that is held by public authorities; the right to participate in environmental decision-making; and the right to review procedures and challenge public decisions that have been made without respecting the two aforementioned rights.

Recommendation 9
Incorporate provisions for access to information, public participation in decision making, and access to justice in environmental matters in the Bill.

10. The erosion of transparent public plan making processes, alternative dispute resolution and the right to a fair public hearing, erodes the rule of law.

It is unclear what else will be in the full Natural and Built Environments Bill. A planning process should be in the new Bill, either the freshwater process, the RMA Schedule 1 process or both planning processes.

By virtue of the New Zealand Bill of Rights Act 1990, "*Every person has the right to the observance of the principles of natural justice by any tribunal or other public authority which has the power to make a determination in respect of that person's rights, obligations, or interests protected or recognised by law*". And "*Every person whose rights, obligations, or interests protected or recognised by law have been affected by a determination of any tribunal or other public authority has the right to apply, in accordance with law, for judicial review of that determination*". The Exposure Draft erodes these fundamental constitutional rights and thereby erodes the rule of law.

The right to a fair hearing is a founding tenet of civilised society. Weakening the right to a fair hearing (whether in court, or through mediation, conciliation or arbitration) weakens the rule of law. As it is, the RMA provides innovative provisions for flexible court procedure (s269 RMA). Alternative Dispute Resolution (ADR) has become more robust, and there are opportunities to conference expert witnesses. Many cases before the Environment Court are on appeal from local hearings, which in our view remains a 'just' avenue, subject to limits.

As to potential improvements, if the legal framework gave effect to "procedural law" such as access to information, public participation and access to justice, as in many other jurisdictions, then it is suggested that appeals on "substantive" planning matters will be vastly reduced. Alternative forums, such as, mediation, conciliation and arbitration, should also continue to be encouraged.

Recommendation 10
Uphold the rule of law, incorporate a transparent planning process, the right to a fair hearing, and use of Alternative Dispute Resolution in the NBA.

11. Include an appeal process on points of law only.

We recognise that in situations concerning plan reviews, where submitters disagree with a councils' decisions, appeals should be able to be brought before the Environment Court. For instance, individuals should have a right to appeal decisions that affect their own private land, such as where Significant Natural Areas are imposed, or to lodge an appeal on a plan provision required by national direction.

However, we agree with the Exposure Draft in providing for appeals on points of law only. The right to appeal decisions is often expensive and lengthy. This was our experience with appeals on adding significant wetlands to our proposed Regional Plan in 2010, for example, which took around two years to resolve in the Environment Court at a high cost to Council. It does not make sense financially to have endless appeals. The public have plenty of opportunities to have their say in the plan development process, informally and formally at the early investigation, drafting, submission, pre-

hearing and hearing stages. Providing for appeals on points of law only should reduce costs to councils as it will help to retain decision-making on plans at the local level, rather than being decided on by the court.

Recommendation 11
Provide for an appeals process on points of law only.

12. Increased centralised decision-making waters down the role of local Councillors and local governance.

To achieve the reform objective of improving local democracy, we believe that decisions at the local level should be made as close as possible to communities affected by them. By eroding mana whakahaere (making local decisions locally), costs, inefficiencies and complexity will increase.

We refute the view that *"[Local] Councils make most decisions based on national direction and Environment Court appeals"*, and therefore RMA reform must centre on increased central government controls. This is in our view an assumption, not a fact. We suggest these views may have manifested due to the overly academic and political thrust of the reform process without due regard to local variations and practical implementation of the RMA outside of court procedure. Local government is capable and we can do it well. This is reflected in the West Coast Region in our Mana Whakahono ā Rohe Participation Arrangement, Regional Policy Statement and Regional Plans. One of our strengths on the West Coast is that we work well together, an example of this is the Mana Whakahono ā Rohe Participation Arrangement.

We acknowledge the RMA needs improvement. But we also believe that the RMA has many strengths and a sound 30-year record of keeping abreast of environmental policy development.

What will further centralising resource management regulation mean for the Local Government Act (LGA)? Is this contrary to the Constitution? Supreme Court decisions on the purpose and principles of the RMA would suggest that the Parliamentary Paper and Exposure Draft require complete and proper scrutiny by the full House.

Moreover, the purpose of local government is *"to enable democratic local decision-making and action by, and on behalf of, communities; and to promote the social, economic, environmental, and cultural well-being of communities in the present and for the future"*. (Local Government Act 2002, section 10 (1)). If these responsibilities are eroded from Regional Councils as proposed, what is left? How will local communities with varying needs within regions be supported by local government?

We believe that empowering local communities and ensuring decision making happens at the most appropriate level so all those affected can contribute, is imperative. The principle of mana whakahaere, or 'local engagement' places a constitutional responsibility on higher levels of government not only to enable the autonomy of local authorities, but to provide these lower levels with necessary support.

The Parliamentary Paper on the Exposure Draft claims in Appendix 2 that "Increased central direction and tools" will increase efficiency and reduce complexity in the resource management system. We disagree with this, and with eroding local government decision-making.

Recommendation 12
Avoid continuous erosion of local democracy, and ensure the NBA provides for local decision-making by implementing our submission Recommendations 5, 6, and 7.

13. Compliance, monitoring and enforcement (CME) are not included, but play a crucial part in resource management at the local level.

The Randerson Report, and discussions that have followed, infer that CME should be removed from local councils and established as a separate entity managed by central government, to address either real or perceived interference from local governance in the compliance monitoring and enforcement field. The logistics and expense involved in this approach is huge. Who would this cost fall upon? And, as with much of the proposals, where is the substantiated evidence that change will be affected?

Decisions on enforcement are made using Council's enforcement policy and the Governor General's guidelines on prosecutions. In response to the Randerson Panel's concern, a positive way forward is to strengthen boundaries between governance and operations, including, for example, codes of ethics and guidelines regarding responding to conflicts of interest from elected officials.

Subsequent to the Randerson Report, discussions have been held with local authorities around creating separate regional CME hubs. A separate regional hub would require setting up a new facility, IT support, financial accounting systems, HR, payroll, and health and safety, to name a few. To find a building in Greymouth to accommodate a Regional Compliance hub would not be feasible, a new facility would have to be constructed. And, yet again, who would pay?

Removing CME from Councils that are already set up and provide a competent consenting and compliance group is counterproductive and expensive, imposing another disproportionate burden on an already distressed rating base.

The West Coast region, although sparsely populated, extends from Kahurangi Point in the north and as far south as Awarua Point, a distance of 600 kilometres (a comparative distance Auckland to Wellington is 640 kilometres). Management of CME functions by central government is likely to not understand and be able to provide constructive and pragmatic solutions to address different environmental impacts in different communities over such a large area. We are concerned that some consent holders may be required to go down an enforcement path that was not the intent in granting the consent. The intent could be lost with centralised implementation.

A regional hub dedicated solely to CME will also create a disconnect between Compliance and Consenting which is not ideal, as working in conjunction with consents staff assists in establishing consent conditions that are practicable and enforceable. Currently there are three District Councils in the Region, Buller in the North, Grey District (Central), and Westland in the South. These offices each provide the public with the ability to call in and discuss their issues. Consent holders and Council staff often develop a good working relationship; if these services were separated and CME management centralised with central government, it makes it harder for a consent holder to understand the systems and develop relationships with compliance staff.

The educational aspect of compliance monitoring could also be lost. A regional hub for CME not only impinges on this right of access to information, participation and justice from the public, it removes it from many.

Recommendation 13

a) Retain CME functions as core responsibilities of local authorities.
b) Strengthen boundaries between governance and operations, including, for example, codes of ethics and guidelines regarding responding to conflicts of interest from elected officials.

14. Transitions are not included in the Exposure Draft to comment on; but they must be provided in the finalised Bill.

The transition from over 100 planning documents to 14 natural and built environments plans (perhaps with many more unwieldy chapters) is not an insignificant undertaking. The transition needs to be carefully considered and properly resourced. There is already a national skill shortage of planners, and councils will be stretched. WCRC needs reasonable transitional provisions in the Bill to be able to get maximum benefit from current and upcoming plan reviews and changes prepared under the RMA. We also have plans at varying stages of development, such as the Te Tai o Poutini Plan and the Coastal Plan. Flexibility is needed in the transitional provisions to enable small interim changes to be made to current plans until full plan reviews can be undertaken.

As Taituarā - Local Government Professionals Aotearoa - has stated, "The success of the new resource management system will depend in large part on how well the transition to and implementation of the new system is planned for, managed and resourced. Central government needs to dedicate considerably more focus and resource to transition and implementation arrangements."

Recommendation 14

Ensure that the timeframe for transiting from the RMA to the NBA is a minimum of 10 years, and provision is made for small interim plan changes to be undertaken.

This ends our submission.

Report to: Resource Management Committee	**Meeting Date: 10 August 2021**
Title of Item: Te Tai o Poutini Plan Update	
Report by: Jo Armstrong, Project Manager	
Reviewed by: Heather Mabin, Acting Chief Executive	
Public excluded? No	

Report Purpose

Update the Resource Management Committee (RMC) on matters relating to the Te Tai o Poutini Joint Plan Committee.

Report Summary

The TTPP Committee met on 26 July 2021. There was discussion on a large variety of topics presented, and approval was given to contract on-going work to inform TTPP development.

Draft Recommendations

It is recommended that Resource Management Committee resolve to:

1. Note the report.

Issues and Discussion

Procurement Processes Underway

We are in varying stages of procurement for two pieces of natural hazard research and for legal services to represent the Committee through until we have an operative Plan.

- NIWA has been offered the opportunity to provide expert input on the landward extent of the High Coastal Hazard areas. A contract is currently being drawn up for this work.
- Initially we did not get any responses to our request for proposals for expert input on the residual risk for Hokitika and Greymouth defended areas. The two month turnaround for the work was considered too tight for all the invited parties. However, two providers are now working together on a proposal for this work.
- We tendered on the Government External Tender site (GETS) for legal services including advice, opinions and representation between now and when TTPP becomes operative. We are discussing details with the preferred provider, and expect to have a signed contract with them this month.

Update from the TTPP July Committee Meeting

An ongoing discussion about Short–Term Residential Visitor Accommodation concluded with the likely outcome that rules in Buller may be more restrictive than in Grey and Westland. As the Buller representatives were unable to attend the July meeting, they will be contacted separately to confirm their views on this matter.

The Committee previously decided to pause further mapping of Significant Natural Areas on private land. This month they discussed the national legislative imperative to include ecosystem and biodiversity provisions in TTPP, and will continue to consider how best to do this for the West Coast.

Also under discussion at the meeting were:

- Landscape and the Coastal Environment
- Activities on the Surface of Water
- Earthworks, and;
- Temporary Activities

Further information on topics under development, and the anticipated delivery schedule for TTPP can be found on the Te Tai o Poutini Plan website at www. https://ttpp.nz/ under "about the plan".

Report to: RMC Committee	**Meeting Date:** 10 August 2021
Title of Item: Consents Monthly Report	
Report by: Leah Templeman, Consents & Compliance Business Support Officer	
Reviewed by: Colin Helem	
Public excluded? No	

Purpose

For the Resource Management Committee to be kept informed of activities in the Consents department, and to provide an update on current matters.

Summary

This is the Consents report for July 2021 activities.

RECOMMENDATION

That the August 2021 report of the Consents Group be received.

Site Visits

Four Consents Sites Visit were undertaken 1 July 2021 to 31 July 2021

22/07/2021	Pre-application site visit, Gloriavale, Haupiri	Visited the sites of standoff pads that will need to be consented under the NES Freshwater. Visited site with consent officer and John Steadfast. Observed location of pads, proximity to waterways and potential for runoff and its management.
22/07/2021	RC-2020-0125, Birchfield Coat Mines, Haupiri	Met on-site with Consents Officer Rachel Clark, Compliance Officer Emma Carrad and Consultant Luke McNeish. Observed the site, location of waterbodies and checked to see if there were any wetlands on the site.
28/07/2021	RC-2021-0082, Hokitika Gold Ltd, Hokitika	Met on-site with Consents Officer Rachel Clark, Compliance Officer Emma Carrad and applicant. Viewed the site and the location of any waterbodies and discussed buffer zones.
29/07/2021	RC-2021-0095. Westland Mineral Sands Ltd, Okari	Met on-site with Consents Officer Rachel Clark, Compliance Officer Emma Carrad, BDC processing officer Rebecca Inwood and Consultant Heather McKay. Viewed the site, the location of any waterbodies and proximity to neighbours.

Non-notified Resource Consents Granted

Fourteen non-notified resource consent applications were granted 01 July 2021 to 31 July 2021

RC-2021-0075 Peter & Margaret Brooker Boundary Road, Maruia	To discharge treated dairy effluent to land where it may enter water and to water being a farm drain discharging into Mitchells Creek.
RC-2020-0154 Grey District Council Greymouth, Cobden	To undertake earthworks and vegetation clearance within the Greymouth Earthworks Control Area at Cobden associated with tracking for the purpose of providing water network infrastructure services.
RC-2021-0081 Jason & Karen McGrath Beechwater Drive	To discharge treated onsite sewage wastewater from a dwelling to land in circumstances where it may enter water, at Lot 26 DP 350045, Beechwater Drive.
RC-2021-0064 Brighton Gully Limited Rutherglen Road	To undertake earthworks associated with alluvial gold mining within MP 60605, at Rutherglen. To take and use water for alluvial gold mining activities within MP 60605, at Rutherglen. To discharge sediment-laden water to land in circumstances where it may enter water, associated with alluvial gold mining within MP 60605, at Rutherglen. To discharge sediment-laden water to water, associated with alluvial gold mining within MP 600605, at Rutherglen.
RC-2021-0086 Campbell Agriculture Ltd Wanganui River	To disturb the dry bed of the Wanganui River for the purpose of removing gravel.
RCF-2021-0079 Canaan Farming Dairy Limited Bell Hill Road, Moana	To discharge dairy effluent to land where it may enter groundwater from stockholding area, DS 403, Bell Hill Road Moana.
RCF-2021-0034 Waiomou Valley Farms Limited Kaniere-Kowhitirangi Road	To discharge dairy effluent to land where it may enter groundwater and surface water from stockholding areas, DS295, Kaniere-Kowhitirangi Road. To convert 73 hectares of land to Dairy Use at DS295 Kaniere-Kowhitirangi Road.

RC-2021-0037 Birchfield's Ross Mining Limited 56 Woolhouse Rd, Ross	To undertake earthworks associated with alluvial gold mining, Ross. To undertake earthworks associated with contouring/flipping activities, Ross. To take and use groundwater via seepage, Ross. Take and use surface water from Donnelly's Creek, Ross. To discharge contaminants to land where it may enter water associated with alluvial gold mining, Ross. To intermittently discharge contaminants to Donnelly's Creek via settling ponds associated with alluvial gold mining, Ross.
RC-2021-0087 Steven Hammond 751 Main South Road	To discharge treated onsite sewage wastewater from a dwelling to land in circumstances where t may enter water, at LOTS 3 4 DP 905, Main South Road.
RC-2021-0114 Cargill RD Barrytown Limited Fagan Creek, Barrytown	To undertake earthworks in the riparian margin to stabilise the banks of Fagan Creek. To undertake earthworks to construct a new channel for the purpose of diverting Fagan Creek. To undertake earthworks within 50m of the Coastal Marine area. To disturb the wet bed of Fagan Creek for the purpose of removing gravel build up. To disturb the dry bed of Fagan Creek for the purpose of removing gravel build up. To alter the foreshore or the seabed to open the mouth if Fagan Creek including the deposition of spoil. To alter the foreshore or the seabed to open the mouth of a farm drain including the deposition of spoil. To permanently divert Fagan Creek into a newly constructed channel.
RC-2021-0083 Birchfield Coal Mines Ltd Doherty Creek	To disturb the bed of Doherty Creek associated with the maintenance and rehabilitation of a diversion channel, Strongman Mine. To divert water through a diversion channel, Doherty Creek, Strongman Mine. To undertake the incidental reclamation of a creek bed associated with its rehabilitation, Doherty Creek, Strongman Mine.

RC-2021-0042 Leonard & Julie Kersten Rotomanu – Lake Brunner	To undertake earthworks at Rotomanu associated with quarrying and associated activities.
RC-2021-0088 Mark Kirkwood & Wendy Bennett Lot 1 DP 366704 Blue Spur, Hokitika	To discharge treated onsite sewage wastewater from a dwelling to land in circumstances where it may enter water, at a Lot 1 DP 366704 Blue Spur, Hokitika.
RC-2021-0101 Ryan & Danielle Eckersley Corner of Keoghan's Road and Mehrtens Road, Hokitika – Lot 13 DP 405842	To discharge treated onsite sewage wastewater from a dwelling to land in circumstances where it may enter water, at Lot DP 405842.

Changes to Consent Conditions

Two applications to change consent conditions were granted in the period 01 July 2021 to 31 July 2021

RC-2020-0032-V1 Colin Hahn & Peter O'Malley Mossy Creek	To replace the superseded Exploration Permit number with the new Mining Permit number
RC-2021-0044-V1 Westreef Services Limited	To increase the amount of gravel taken from the Iron Bridge extraction site.

One Limited Notified and no Notified Resource Consent were Granted 01 July 2021 to 31 July 2021

One application for Limited Notified were granted in the period 01 July 2021 to 31 July 2021

RC-2020-0068 Westland Dairy Company Limited Hokitika River	To disturb the wet bed of the Hokitika River for the purpose of removing gravel for channel clearance. To divert water into the North Channel of the Hokitika River for dairy manufacturing purposes.

Report to: RMC Committee	**Meeting Date:** 10 August 2021
Title of Item: Compliance and Enforcement Monthly Report	
Report by: Colin Helem Compliance Team Leader	
Reviewed by:	
Public excluded: No	

Purpose

For the Resource Management Committee to be kept informed of activities in the Compliance and Enforcement department, and to provide an update on current matters.

Summary

This is the Compliance and Enforcement report for July 2021 activities.

RECOMMENDATIONS

1. *That the August 2021 report of the Compliance Group be received.*
2. *That the $6000 bond for RC10273 Blacktopp Mining Ltd is released.*

Site Visits

A total of 52 site visits were undertaken during the reporting period, which consisted of:

Activity	Number of Visits
Resource consent monitoring	5
Mining compliance & bond release	40
Complaints	7
Dairy farm	0

This report covers the period of 1st July 2021 to 29 July 2021.

- A total of 11 complaints and incidents were recorded.

Non-Compliances

Note: These are the activities that have been assessed as non-compliant during the reporting period.

A total of 2 non-compliances occurred during the reporting period.

Activity	Description	Location	Action/Outcome	INC/Comp
Gold Mining	Complaint received that a mining operation is discharging sediment laden water which has significantly discoloured the receiving creek.	Goldsborough	The site was investigated and established that the discharge from the operation had significantly discoloured the creek in breach of consent conditions. Samples have been obtained and awaiting analysis before considering further action.	Complaint

Activity	Description	Location	Action/Outcome	INC/Comp
Rubbish	Complaint received that a property owner has been accepting rubbish that is not classed as cleanfill and disposing it on their property.	Westport	The site has been investigated and established that the site has been accepting rubbish which includes demolition material. Enquiries are ongoing.	Complaint

Other Complaints/Incidents

Note: These are the other complaints/incidents assessed during the reporting period whereby the activity was found to be compliant, or non-compliance is not yet established at the time of reporting.

Activity	Description	Location	Action/Outcome	INC/Comp
Flood protection	Complaint received that rock protection work is causing erosion of a farm property.	Kapitea Creek	Enquiries are ongoing	Complaint
Stormwater	Complaint received that storm water from an adjacent property was causing flooding/ponding on the complainant's property.	Cobden	The site has been investigated and enquiries are ongoing.	Complaint
Gold mining	Complaint received that a mining operation has caused a discharge of sediment that has impacted the public road. The miner also self-reported the incident.	Greenstone	The complaint was investigated and established that a clean water pipe had broken causing the discharge of sediment. The operator carried out remedial work immediately. Enquiries are ongoing.	Complaint
Rubbish	Complaint received that there was rubbish strewn along the beach at Ross as a result of the recent storm event.	Ross	The beach was walked by a WDC staff member who located minimal rubbish and removed it.	Complaint
Discharge of waste water	Complaint received that a residential property had a discharge pipe from their septic tank going into a drain.	Camerons	The site was investigated, and it is unknown if the buried pipe is connected to the septic tank. There was no discharge from the pipe at the time of the inspection.	Complaint
Dairy farming	Complaint received that a standoff pad may be discharging effluent.	Kowhitirangi	Complaint recently received and enquiries are ongoing.	Complaint
Discharge to water	Complaint received that a fuel trailer during the flood event has ended up in the Buller River and is discharging fuel.	Whitecliffs	The fuel trailer was located and was not discharging fuel as it appeared to be empty and upright. The owner was contacted and was going to recover it.	Complaint

Activity	Description	Location	Action/Outcome	INC/Comp
Dead Stock in CMA	Complaint received that a dead cow was on the beach at Rapahoe	Rapahoe	Contractor was organised to recover the carcass.	Complaint
Dead Stock in CMA	Complaint received that a dead cow was on the beach at Granity.	Granity	Contractor was organised to recover the carcass.	

Update on Previously Reported Ongoing Complaints/Incidents

Activity	Description	Location	Action/Outcome	INC/Comp
Dumping of materials (June report)	Complaint received that non cleanfill material has been disposed of onto a section.	Karoro	The site has been investigated and established that some non cleanfill materials had been dumped on site. Enquiries are ongoing. **Update:** The owner of the property has been spoken to on site and advised of the MFE guidelines for cleanfill disposal. The property owner advised that some unknown persons had also taken the opportunity to dump on the property. As most of the waste disposed is cleanfill the property owner was directed to remove any unauthorised material and to monitor the site more closely.	Complaint

Formal Enforcement Action

No formal enforcement action was undertaken during the reporting period.

The Council received the following four work programmes during the reporting period. All programmes have been approved.

Date	Mining Authorisation	Holder	Location	Approved
05/07/2021	RC-2019-0074	Western Dynasty Holdings Ltd	Stafford	Yes
05/07/2021	RC-2017-0002	Mill Creek Mining Ltd	New River	Yes
06/07/2021	RC-2017-0051	Bathurst Coal Ltd	Cascade Mine Denniston	Yes
26/07/2021	RC11001	Phoenix Mining Ltd	Nemona Forest	Yes

The following bond was received during the reporting period

Date	Mining Authorisation	Holder	Location	Amount
21/07/2021	RC12228	Robert Graham	Taipo Valley	$12,000

The following bond is recommended for release

Mining Authorisation	Holder	Location	Amount	Reason For Release
RC10273	Blacktopp Mining Ltd	Marsden	$6,000	Mining has concluded and Rehabilitation completed.

Report to: RMC Committee	**Meeting Date:** 10 August 2021
Title of Item: Intensive Winter Grazing	
Report by: Colin Helem Acting Consents & Compliance Manager	
Reviewed by:	
Public excluded: No	

Purpose

For the information of the Resource Management Committee regarding national reporting of Intensive Winter Grazing activities.

Summary

The national environmental standards for intensive winter grazing (IWG) came into force on 1 May 2021. The Minister for the Environment later deferred the implementation date for most of the IWG regulations until 1 May 2022.

The deferment of IWG rules was on the basis that Regional Councils undertake increased monitoring and reporting to ensure there are measurable improvements in IWG practice.

The attached report is the first report required by the Minister.

RECOMMENDATIONS

1. *That the Intensive Winter Grazing report dated 1 August 2021 be received.*

1 August 2021

Hon David Parker
Minister for the Environment
Private Bag
Wellington 6140

Dear Minister Parker

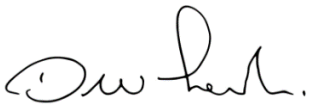
Regional Council report on Intensive Winter Grazing

I am pleased to provide you with a copy of the first Intensive Winter Grazing (IWG) report on behalf of Regional Councils. This report is the first quarterly report requested in your letter to Environment Southland dated 16 March 2021. Environment Southland has provided an additional update expanding on their efforts to address IWG practice. This will be sent to you separately but is also attached as an appendix to this report for completeness.

The report highlights the seriousness with which Regional Councils have taken this matter and also the significant efforts of those councils and the Primary Industry Sector groups to provide tools and support to improve winter grazing practices and to increase interventions where poor practices are observed.

As requested a further report will be submitted by 1 November 2021 which will demonstrate our ongoing commitment to achieving improved IWG practices across New Zealand.

Yours sincerely



Doug Leeder
Chair, LGNZ Regional Sector
Local Government New Zealand

Cc: Minister O'Connor

Appendix 1 IWG report to Minister Parker 1 August 2021
Appendix 2 Regional council compliance monitoring and enforcement IWG
Appendix 3 Minister Parker Letter to Nicol Horrell 16 March 2021
Appendix 4 Primary sector organisations winter grazing checklist
Appendix 5 Chairman Horrell to Minister Parker - IWG Q1 report 1 August 2021

REGIONAL COUNCIL REPORT ON INTENSIVE WINTER GRAZING

1 AUGUST 2021

Executive Summary

This report sets out the actions taken by Regional Councils and Primary Sector organisations to support improvements to intensive winter grazing on crop (IWG) practices in 2021. Overall it can be seen that there has been strong collaboration across Regional Councils and primary sector organisations to provide education, support and tools for farmers. This has resulted in a significant uptake of IWG planning and good management practice (GMP), increased farmer engagement on IWG, and planning for expanded compliance and monitoring programmes.

This report presents a preliminary view of the activities to 30 June 2021. A complete review of activities will be included in the next quarterly report due 1 November 2021. While it is acknowledged that there is still more to do it is considered that this report presents a positive response to improving IWG practices.

Background

In response to a number of recommendations made by the Southland Intensive Winter Grazing NES Advisory Group (SAG) the Minister for the Environment deferred the implementation date for most of the IWG regulations in the National Environmental Standards for Freshwater (NES-FW) from 1 May 2021 until 1 May 2022. The NES-FW regulations that control further expansion of IWG are now in force.

In a letter to Southland Regional Council and other SAG members dated 16 March 2021 the Minister for the Environment advised the deferment of IWG rules was on the basis that Regional Councils (RCs) and the farming sector, as represented by industry-good organisations, commit to:

- Improve IWG practice during the 2021 year and beyond by rapidly deploying an IWG module that will be a prototype for inclusion in the certified Freshwater Farm Plans (FW-FP) currently under development; and
- Undertake increased monitoring and reporting to ensure there are measurable improvements in IWG practice during the year.

The letter further outlined that the Minister for the Environment expected to see:

1. Farmers putting in place better practices such as providing appropriate buffers that are uncultivated and ungrazed around waterways and critical source areas; and retiring steeper slopes that are unsuitable for IWG;
2. RCs undertaking increased monitoring of IWG practices, and taking compliance action against breaches of the law;
3. More effective monitoring by councils of receiving environments such as rivers and estuaries to show if their health is improving;
4. Council monitoring of the total hectares in IWG, and enforcement of the rule against the area in IWG increasing on any one farm; and
5. Quarterly progress reports to the Minister commencing 1 August 2021.

This report is the first of the quarterly reports and provides an overview of the activities undertaken up to 30 June 2021 to meet the requirements listed above.

This report is a collaborative undertaking between RCs and primary sector organisations. It was recognised by all parties that this collaborative approach provided the best chance of achieving positive change quickly.

Discussion

A summary of the key activities carried out in the three months to 30 June 2021 includes the following actions:

- Collaborative primary sector effort to develop and distribute the IWG checklist to 21,000 properties.
- Development of industry IWG modules and plans that informed, and were informed by, MPI and MfE's IWG module.
- Appointment of an IWG Co-ordinator in collaboration with MPI and MfE to support the collection and sharing of best practice advice, relevant updates and extension events nationally.
- More extension events focussed on good IWG practices.
- Increased promotion of an existing IWG hotline to report poor practice.
- A large increase in IWG plan downloads.
- A proactive dairy farmer survey by Fonterra focussed on IWG planning.
- Aerial and on-ground monitoring by Regional Councils with extended programmes planned between 1 July and 30 September.

Proactive approach to wintering

There has been a proactive approach to wintering in 2021 with education and support offered before and during the winter grazing season. This proactive approach has focussed on identifying and addressing potential issues before winter. Examples of this proactive approach have been demonstrated by Environment Southland, with summer cultivation flights and followups with farmers; MPI, with education and support followups with cases from previous season; industry bodies, working collaboratively with each other and regional councils to provide pre-wintering information and support to farmers.

Regional sector

A short survey on current IWG knowledge and practices was circulated to all RCS in May 2021. The survey sought information relating specifically to IWG on: rural sector engagement, planning, consenting, farm plans, compliance monitoring and development of tools to assist compliance monitoring and reporting. The results, which were received from 16 RCs, showed a range of approaches to IWG depending on the extent of the practice within a region.

Most RCs indicated that additional resourcing for freshwater implementation will be added from 1 July 2021, when 2021-2031 Long Term Plans take effect. These additional resources will respond to expectations to monitor new rules contained in the NES-FW such as IWG. RCs noted that they will be balancing resourcing deployed to plan-making, compliance and enforcement and environmental monitoring as part of the package of work required under the NPS-FW and NES-FW.

At the time of the survey, many RCs were still developing their response to the new regulations, including IWG in the 2021 winter. For example, those RCs where IWG is a more significant activity

such as Southland, Otago, Canterbury and Horizons, are already undertaking compliance monitoring, investing in industry-sector engagement and exploring different technologies to assist with identification and monitoring of IWG in the future. RCs have begun exploring opportunities to utilise technology to achieve improved and more consistent monitoring and reporting on IWG. These projects include the development of an app to support IWG planning and the use of satellite imagery to identify the extent of IWG.

All RCs that responded continue to engage with their rural sector (industry groups, farming consultants, farmers, catchment groups) on IWG requirements, often as part of engagement on the Essential Freshwater changes. The intensity of engagement tends to reflect the extent of primary production in a region.

Increased compliance monitoring and Extension Services
As very few consents have been issued, and there were limited rules in place prior to the NES-FW there is little compliance monitoring or complaint/incident data to meaningfully report as a baseline or comparison for the 2021 year. RCs that have existing rules to manage IWG continue to monitor this activity.

Monitoring activities will occur in 2021 through fly-overs and on-ground checks. These activities have been undertaken in previous years however a number of RCs are now increasing their activities.

The IWG activity reported to 30 June 2021 is attached. Much of the compliance and monitoring activity will occur between 1 July 2021 and 30 September 2021. Updated compliance data will be provided with the next quarterly report.

Many RCs offer extension services in order to promote good practice on-farm. These services are often undertaken in collaboration with primary sector organisations or catchment groups. Extension services can range from public meetings, topic-based or area-specific workshops as well as 1:1 on-farm visits. All RCs were also encouraged to promote and share the key messages and supporting material contained within the IWG module released by MPI in 2021.

Environmental monitoring of receiving environments
Existing water quality monitoring continues and is expected to significantly increase in all regions. RCs anticipate that the increased monitoring of receiving environments will be undertaken as part of the broader suite of freshwater monitoring required under the new NPS-FW. Monitoring currently underway will support the identification of high risk areas for IWG activity and will also inform compliance and monitoring programmes.

Total Area in IWG
At present are a range of methods being used to assess the extent of winter grazing being undertaken. RCs use a range/variety of satellite imagery and mapping tools to identify grazing and assess risk. There is an opportunity for RCs to pool expertise and funding to develop a more standardised approach to enable an assessment of scale, risk categorisation and identify high-risk sites. This will help with compliance monitoring and consenting prioritisation as well as providing consistent data on IWG at a national scale. RCs currently working with Manaaki Whenua to develop this project and hope to have it confirmed during the 2021 IWG year for inclusion in the 1 November report.

The following table provides an estimate from Regional Councils of the number of farms undertaking IWG activity. Through the delivery of the project with Manaaki Whenua we hope to provide a more accurate picture of the scale of the activity on a national scale.

Council	Estimated Farms with IWG?	Comments
Auckland	Unknown	Winter grazing is not thought to be a common practice in Auckland. Auckland Council does dairy farm compliance monitoring but there is no monitoring under the IWG regulations.
Bay of Plenty	>30	Estimated using field staff's corporate knowledge and Nutrient Management Plans to develop a spreadsheet of known areas. More work to do to develop the list.
Environment Canterbury	2,600	Estimated based on information from a machine learning model and GIS tool that uses satellite imagery to identify 'potential wintering crops'. This is 2021 data and has not been ground-truthed. This method is likely to overestimate IWG area.
Gisborne	20	Estimate included in the s32 report for the Proposed Freshwater Plan for Gisborne Region 2015.
Greater Wellington	800	Indicative number given by Beef + Lamb New Zealand (B+LNZ).
Hawkes Bay	700	Up to 700 farms based on aerial imagery.
Horizons	Unknown	
Marlborough	Unknown	Project initiated to identify IWG areas, and there would appear to be more than thought, but to date not a high priority environmental concern. Marlborough only has 46 dairy farms and its main primary production areas are viticulture and aquaculture.
Nelson	0	
Northland	Unknown	Winter grazing is not thought to be a common practice in Northland. A full stock take of winter grazing activities on dairy platforms will be conducted from July 2021 along with the farms' annual inspections.
Otago	Unknown	Expect to receive a baseline of hectares of dairy forage crops from regulation 36 NES-F information provision.
Southland	3,500	Extent to IWG per farm varies considerably.
Taranaki	Unknown	Inspect most farms annually, but do not currently focus on IWG.
Tasman	Unknown	Inspect 143 dairy farms, but do not currently focus on IWG.
Waikato	2,000	Estimate.

Table 1: Regional Council Estimate of the total number of farms with IWG by Region (Source: Regional Sector Survey 2021)

Primary industry sector events and activities

Primary sector organisations have responded to the expectations in the Minister's 16 March letter by increasing the already significant activity being undertaken to promote better IWG practices nationally.

Extension Events

Primary sector organisations have undertaken over 150 events across New Zealand focused on IWG over 2020 and 2021. In 2020, there were 96 B+LNZ and DairyNZ events focussed on IWG. To date in 2021, these organisations have undertaken 63 IWG-related events focussed on implementing good practice.

Often extension events are collaborative and include multiple primary sector organisations (e.g. Federated Farmers, Deer Industry NZ (DINZ), DairyNZ and B+LNZ), RCs and can include collaborative efforts with not-for-profit groups, for example Thriving Southland.

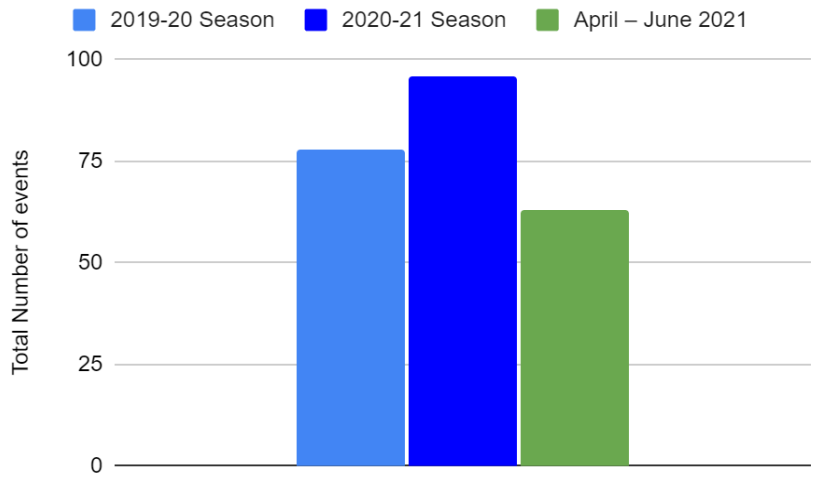


Figure 1: Total number of extension events hosted by DairyNZ and Beef + Lamb New Zealand. (Note the bar in green is only for three months of this season)

There has been a range of extension activities focussed on winter grazing, with much of the effort going into face-to-face field days and discussion groups. Farmers have also been directly contacted through phone calls with primary sector staff or in person on farm to discuss the resources and tools available and answer any specific questions about IWG.

The total number of farmers attending events is measured in the thousands, with 1,771 attending IWG events in 2019, 2,867 attending in 2020 and to June 2021 there have been 1,264 attendees at IWG events with more planned during the winter months.

Improved farming practice

Fonterra Cooperative Group has been active in contacting farmers undertaking IWG in Southland. The firm's sustainability staff have undertaken 103 phone interviews, with questions focussed on IWG planning. The results of which can be summarised as:

- Farms that have an IWG Plan in Place or are in the process of completing one = 62%
- Farms without an IWG Plan = 29%
- Farms that were no longer undertaking IWG on their farm or moving out of dairy = 9%

The results show that two thirds of farmers interviewed have taken action to prepare an IWG plan for winter. An update on these numbers will be included in the next quarterly report.

Fonterra has one of the largest farm environment plan (FEP) programmes in the country, which collects data from all Fonterra suppliers who have an FEP. The FEP programme focusses on the Good farming practice principles as set out in the Action Plan for Water Quality 2018. Principles 14, 'use appropriate paddocks for intensive grazing' and 15, 'manage grazing to minimise nutrient loss from risk areas' relate specifically to mitigating the risk associated with IWG. The below table demonstrates that of the 430 Southland farms with a Fonterra FEP 84% a meeting GFP 20 and 79% are meeting GFP21.

Good Farming Practice Principle	Farms with Fonterra FEP	% Farm Meeting All IWG GFP
14	419	84%
15	419	79%

Table 2 – Percentage of Fonterra FEP's delivered in Southland that meet Principles 14 and 15 from the Action Plan for Water Quality 2018.

IWG module

Many primary sector groups and RCs have invested in the development of farm plans to support improved farm practices. In April, an IWG module was developed by the Ministry for Primary Industries (MPI) and Ministry for the Environment (MfE) with input from Regional Councils. The module was developed to help kick start IWG planning and provide a set of IWG practice expectations.

B+LNZ and Dairy NZ updated their existing IWG plans to reflect this module, so farmers were able to access consistent information from either MPI, B+LNZ or DairyNZ.

The sector generally supports the national IWG module that has been developed and intends to continue the incorporation of this material within their templates and practice. It is anticipated that further uptake of the new IWG module will be seen in the 2022 season as much of the planning for 2021 had already been completed. Additionally, the inclusion of IWG into Freshwater Farm Plans will also provide greater clarity for all parties on the role of farm planning in achieving good management practice on all farms that undertake IWG.

Both DairyNZ and B+LNZ host many IWG resources, tools and factsheets on their websites.
There has been a marked increase in traffic to B+LNZ's IWG web content in 2021, with over twice as much traffic to this part of the website compared to previous years. DairyNZ's website traffic has also been high and has been relatively consistent when compared with previous years.

The most noticeable increase in IWG digital activity, however, is in the number of downloads of IWG plans with an almost five-fold increase in IWG plans downloaded in 2021 compared to 2019. This number will continue to rise as 2021 farmers uptake the use of an IWG for planning crops for the 2022 season.

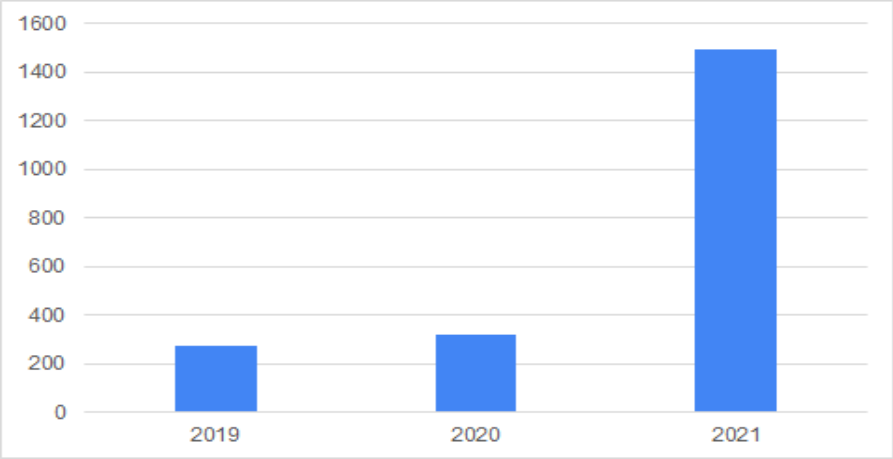


Figure 2 - Combined downloads for intensive winter grazing plans (Beef + Lamb New Zealand: forage cropping templates, forage cropping chapter, paddock plan template and DairyNZ: Winter Grazing Plan, Winter Grazing Checklist).

IWG checklist

Federated Farmers, DINZ, DairyNZ, B+LNZ and the Foundation for Arable Research (FAR), developed a winter grazing checklist to help achieve good management practices. The checklist was designed to help farmers with immediate decision making in early winter 2021 and focussed on an assessment of preparedness which highlighted any potential gaps that needed addressing.

The checklist was delivered to 21,000 rural addresses and was supported by a promotional campaign, which included NZME and MediaWorks promotions, radio interviews and paid advertisements. The campaign was designed to increase the uptake of the checklist and help farmers meet GFP. A copy of the checklist is included.

IWG incidents and enforcement

A hotline (0800 FARMING) was set up prior to winter 2021. This line, which is operated by Federated Farmers and supported by industry and RCs, was provided as an opportunity for the community to report concerning IWG practices for follow up.

From the start of 2021 until 30 June 2021, 14 cases were opened as a result of the hotline, with 12 in Southland, 1 on the West Coast and 1 in Otago.

Of these:

- nine were resolved with seven of those no having no issue found and two requiring minor action resolved on site;
- four remain under investigation; and
- one was unable to be found as not enough information was provided in order to locate the property concerned.

The 0800 line is a collaborative initiative to promote the reporting of poor practice by people who may be hesitant to call a council direct. It enables quick action and targeted interventions with significant cases being referred to Council's for investigation.

Conclusions

RCs and primary sector organisations have responded to the expectations of the Minister to see immediate improvements in IWG practices. While a significant amount of work was already underway, there has been a sustained and collaborative effort from all parties in 2021 to address those poor practices, which may have an adverse effect on the environment. While the data shows that there has been significant engagement in 2021, it is acknowledged that there is further work to do in some areas, including compliance and monitoring activities, the continued uptake of IWG Farm Plans and monitoring and evaluation of receiving environments.

We anticipate in the next quarterly report due in November to include greater details on regional council compliance and monitoring activities and results, an update on the project to identify the scale of IWG nationally and further updates on the extension and support activities being undertaken by primary sector organisations to deploy the IWG module.

As well as input from Regionals Council staff we would like to acknowledge the following groups for their contributions to this report:

- DairyNZ Ltd
- Beef + Lamb New Zealand Ltd
- Federated Farmers of New Zealand Inc.
- Deer Industry New Zealand
- Open Country Dairy Ltd
- Fonterra
- MPI

Appendix 2 – Regional Council compliance monitoring and enforcement

Table 1 - Reactive monitoring based on IWG complaints, incidents and enforcement

	Number of IWG complaints	Incidents linked to IWG	Water quality issues linked to IWG	Enforcement action taken	Comment
Auckland	0	0	0	0	
Bay of Plenty	0	0	0	0	
Environment Canterbury	0	0	0	0	3 complaints in July 2021.
Greater Wellington	0	0	0	0	Not a lot going on here re monitoring of IWG at present. We are working with our Land Management team on helping farmers out with the IWG module and encouraging as many as possible to get started on those.
Hawkes Bay	0	0	0	0	One complaint has been received in early July which was followed up with a site inspection a satisfactory plan was in place, and further advice was given. No formal action taken.
Horizons	0	1	0	0	Officers attended and found no issues.
Marlborough	0	0	0	0	
Nelson	0	0	0	0	
Northland	0	0	0	0	Farms Inspections have started, and a full audit will be completed by December 2021.
Otago	0	2	0	0	2 incidents with IWG observed from the flyovers that were investigated under the regional plan. Ground truthing found that the rules were not in breach.
Environment Southland	16	20	0	1 under investigation	
Tasman	1	0	0	1 formal warning 6 under investigation	
Waikato	0	0	0	0	
West Coast	0	0	0	0	

Table 2 – Proactive IWG compliance monitoring activities

	Number of flyovers	Satellite imagery	IWG site visits or audits	Advice and education	Comment
Auckland	0	0	0	0	IWG is not a prevalent issue in this region. A generic information letter will be sent to dairy farmers to just advise them of the requirements.
Bay of Plenty	0	Region wide	IWG to be checked as part of dairy audits in spring	Letter to all dairy farmers - 650	Aerial photography to be undertaken later in 2021. IWG is relatively small in the BoP with 40-50 properties. We will mostly be dealing with farmers undertaking IWG as part of our other business activities. Rotorua NMPs to be reviewed in 2022, LMO's have commenced discussions with farmers with many indicating they won't continue with IWG next year. Liaison with rural sector organisations (e.g. Fonterra) seeking support, consistent messaging and data where they have it (they said no to the data for individual farms).
Environment Canterbury	0	Whole region	20 direct site visits in 2020. 211 audits of farm environment plans (these may or may not have had IWG component but look at the risks as a whole)	500 – these were in regard to meeting our regional rules not directly about IWG.	1,150 properties have individual land use consents that get audited. A further 1500 properties are audited under the irrigation schemes consents. ECAN had not included a required IWG component into the audit tool until 2021/22. From 2021/22 onward IWG will be assessed as part of the FEP Audit.
Greater Wellington	0	0	0	0	Lots of education and responding to farmers queries going on, working with industry as much as possible with that.
Hawkes Bay	0	Region wide analysis of crops, slope and proximity to waterways 2018 imagery	0	Commencement notifications received from consented feedlots as	P A significant amount of education and training has been completed by the Nonregulatory advisory team including: - Pre and during activity sampling by consented feedlots - Nuhaka farm field day (14 farmers) fodder beet crop, pre-grazing plan and buffer zones CSA's - Information Video: Puketitiri farm, on HBRC website

	Number of flyovers	Satellite imagery	IWG site visits or audits	Advice and education	Comment
		and April 2021 imagery		required by the consent	- Field day with B&L NZ, Patoka Grazing plans (pregrazing) identifying CSAs buffer zones slope factors. - 4x IWG workshops. This has been a relatively dry year in Hawkes Bay and most IWG issues arise with significant rainfall. A flyover is planned for late July, early August predominantly over Central Hawkes Bay. There are 17 Feedlot resource consents where site visits are scheduled for the July early August period.
Horizons	0	Rangitikei area	0	0	
Marlborough	1 (150,000 ha)	GIS project mapping locations in MDC area being used as a baseline for future monitoring.	31 dairy farms visited with Dairy Monitoring for 2020-21, no IWG on the farms monitored. Land transition programme site visits distributing IWG Module.	Email sent to 46 Dairy Farms within District with relevant information and fact Sheets.	Website updated with NES-FW Regulations and Fact sheets Industry stakeholders sent fact sheets relevant to IWG and other regulations Held meetings with Federated Farmers and stakeholders discussing the new regulations and requirements. Online forms created to supply information to council as per requirements of NES-FW Regulations.
Nelson	0	0	0	0	NCC only has 2 dairy farms in the district and neither of them undertake IWG.
Northland	0	0	0	0	Fonterra indicated less than 10 farms partake in IWG in the Northland region from their data.
Otago	3 (North Otago, Central Otago and West/South Otago)	0	13	Fact sheets and information on website. Letter sent to all dairy farms advising of new rules.	13 follow up inspections were completed in Otago from the cultivation flyover where farmers were provided educational advice. Partnering with the primary industry sector groups to promote good management practices.

	Number of flyovers	Satellite imagery	IWG site visits or audits	Advice and education	Comment
				Video on IWG good management practice online.	Regulatory staff have been providing advice and information and speaking at events when invited. This advice and information included speaking at catchment group sessions, workshops on IWG and field days; meetings with industry groups, stakeholders and other Regional Councils; responding to phone call and email questions and providing as much information on our website as possible. Plan Change 8 includes intensive grazing requirements.
Environment Southland	2 (all Southland area)	0	10 follow ups by Land and Water Services team from cultivation flights. 2 Compliance visits	General advice and education provided	Generally an improvement in IWG practices.
Tasman	2 (70,000ha)	0	1 site visit undertaken and 15 scheduled for varying scales of observed issues/sites of interest.	1 advice letter	One predominantly agricultural catchment yet to be flown. Overall the monitoring is showing farms are for the most part practicing good winter grazing techniques. Pugging is looking like the main issue possibly caused by lack of prevention of stock having access back into grazed areas. No known increase in areas of IWG from the limited historic info we have. Also getting feedback that a number of farmers have stopped IWG for alternative methods even though we don't have the base data. Lot of ground truthing still to be done.
Waikato	0	0	Dairy Inspections have not seen any issues with IWG	0	Conversations with many farmers with regards to IWG and what is best practice. The team are aware of IWG risks and watching out for it when monitoring farms
West Coast	0	0	0	Fact sheet available on Council website	Flyover to be completed in July, with site visits in July/August. Have met with two MPI inspectors that work on the West Coast to collaborate on inspections and sites of interest. Ground inspections will be followed up on after the aerial Flights.

Hon David Parker BCom, LLB

Attorney-General
Minister for the Environment
Minister for Oceans and Fisheries
Minister of Revenue
Associate Minister of Finance

16 March 2021

Nicol Horrell
Chair, Environment Southland

Dear Nicol

Intensive winter grazing module for freshwater farm plans

I really appreciate the time and effort that members of the Southland Intensive Winter Grazing NES Advisory Group (SAG), including from your Council, put into their report of 10 December 2020 (the report). This advised on the implementation of the intensive winter grazing (IWG) regulations in the Resource Management (National Environmental Standards for Freshwater) Regulations 2020 (NES-F).

The Minister of Agriculture and I believe that improvements in IWG practice relating to freshwater will be achieved in the medium term primarily through certified freshwater farm plans (FW-FPs), rather than through default permitted activity conditions in the NES-F that serve as a bottom line (although that may still be necessary for some).

In response to SAG advice, I have decided to defer the start date for parts of the IWG regulations (ie for permitted activities and related resource consents) for a period of one year (from 1 May 2021 until 30 April 2022). This will be country-wide, bearing in mind that SAG members were reflective of views elsewhere, although the most serious IWG issues are in southern areas of the country.

The Minister of Agriculture and I are announcing the deferment today. See the attached embargoed press release. The deferment is in return for regional councils (councils) and the farming sector committing to:

- Improve IWG practice during the year by rapidly deploying an IWG module that will be a prototype for inclusion in the certified FW-FP regime currently under development; and

- Undertake increased monitoring and reporting to ensure there are measurable improvements in IWG practice during the year.

The NES-F regulations that control *further* expansion of IWG will not be deferred and will need to be enforced.

The roll-out of a prototype IWG module (a draft of which was in the report) is an opportunity to show the effectiveness of a FW-FP approach to improving freshwater health outcomes. The deferment will facilitate the prototype being ready for formal incorporation into certified FW-FPs in 2022.

Private Bag 18041, Parliament Buildings, Wellington 6160, New Zealand
+64 4 817 8710 | d.parker@ministers.govt.nz | beehive.govt.nz

For IWG during the year, my expectations of councils and the farming sector are:

As above, to:

- Improve IWG practice during the year by rapidly deploying an IWG module that will be a prototype for inclusion in the certified FW-FP regime currently under development
- Undertake increased monitoring and reporting to ensure there are measurable improvements in IWG practice during the year.

And further to this:

- Demonstrable and early progress in deploying the IWG module
- Farmers putting in place better practices such as providing appropriate buffers that are uncultivated and ungrazed around waterways and critical source areas, as recommended in the SAG report; and retiring steeper slopes that are unsuitable for IWG
- Councils carrying out more monitoring of IWG practices and taking compliance action against breaches of the law
- More effective monitoring by councils of receiving environments such as rivers and estuaries to show if their health is improving, ie whether significantly less sediment and other contaminants are ending up in them
- Council monitoring of the total hectares in IWG, and enforcement of the rule against the area in IWG increasing on any one farm; and
- Quarterly progress reporting to me on the above points through Environment Southland (and other councils as appropriate), ie on 1 August and 1 November 2021, and 1 February and 1 May 2022.

The Ministry for Primary Industries will also be responding to animal welfare complaints and prosecuting as appropriate where breaches of the law occur.

Once the IWG regulations enter into force from 1 May 2022, farmers will have the option of undertaking IWG through a certified FW-FP as an alternative to complying with the default permitted activity pathway in the regulations, or obtaining a resource consent.

In addition, any changes (if desirable) to rules associated with the default permitted activity pathway will have been progressed by this time.

Thank you again for your important contribution to this work, and I have asked officials to continue working with you, SAG members and others to ensure the successful roll-out of the IWG module.

I look forward to receiving regular updates on progress. Meanwhile, please note that this letter will be made available to other parties with an interest in IWG.

Yours sincerely

Hon David Parker
Minister for the Environment

Attachment:

Copied to:

Hon Damien O'Connor, Minister of Agriculture

Members of, and observers to, the SAG

ARE YOU SET FOR WINTER?

Use our winter grazing 2021 checklist to check and improve your winter preparations

What you do this winter matters to all farmers

This year, what we do during winter will be scrutinized more than ever so it is important we all do our bit and get it right. It isn't too late to make improvements for this winter. Animal welfare and environmental protection are both extremely important.

Use our easy checklist

The checklist below will help you assess whether you've covered off the key preparations for grazing.

Note: *your regional council may have more stringent rules which apply in your area. If you're unsure please check with them.*

Wintering Checklist	Green I'm all set to go	Orange This could be improved	Red Not planned, needs more preparation
Stock are excluded from waterways. You have a minimum buffer of 5m (more is required for sloping ground).			
Critical source areas (CSAs) are protected: ideally keep stock off them for the whole winter period. If you have cropped CSAs, fence them off and graze them last during good weather after the rest of the crop has been fed. Leave a good buffer area at the lowest point to filter any sediment run-off.			
Graze paddocks strategically. If adjacent to a waterway, graze towards the waterway. If on a slope graze downwards and in the direction of the water flow, or using a strategic plan suited to your location (such as an extra wide buffer).			
Plan the placement of supplementary feed and portable water troughs away from waterways, critical source areas, and ponding areas.			
Animal welfare requirements are critical: transition carefully, consider shelter, ability to lie down on firm ground, and access to water.			
Measure feed to accurately assess quantity, and plan daily feeding to ensure adequate feed for the whole winter (including extra feed for poor weather).			
Plan and manage mobs to reduce the risk of lambing / calving on crop.			
Develop an adverse weather plan for each winter grazing area to ensure that animal welfare and environmental protection needs will be met in poor weather.			
Make a plan to record evidence (photos, video, your farm diary) showing that good management practices are being implemented; and to use this year's learnings to inform next year's plan.			

Green You're confident you're ready for the coming season, great work!

Orange Check your preparations are in order, and complete any further necessary work. Check out the resources below which can help you.

Red Now's the time to take action and sort out your planning – all farmers will be under scrutiny so you don't want to let the team down. Check out the resources below to help your preparations so you're winter ready.

Resources to help your winter planning and preparations

Beef & Lamb – **beeflambnz.com/wintergrazing**

Dairy NZ – **dairynz.co.nz/wintergrazing**. Dairy farmers can also contact their milk company for information.

Deer NZ – visit **deernz.org** and search for 'wintering feed systems'

MPI – **mpi.govt.nz/protecting-freshwater-health**

Foundation for Arable Research (FAR) – visit **far.org.nz/resources** and search for 'winter grazing'

In some regions, your local catchment group may also have information to assist you.

To check if there are any local rules you need to meet, contact your local regional council. If you're planning to expand your grazing or become more intensive you may need to check with your regional council if you need a consent.

Looking to the future

Going forward, all farmers who graze stock over winter will need to have a documented winter grazing plan. This plan can become part of your Farm Environment Plan.

DairyNZ and Beef + Lamb NZ are supporting farmers with wintering resources, information and events – look out for more information on these.

This information is brought to you and supported by:

DairyNZ beef+lamb new zealand Deer Industry New Zealand Federated Farmers of New Zealand FAR

environment SOUTHLAND
REGIONAL COUNCIL
Te Taiao Tonga

1 August 2021

Our Reference: A678031

Hon. D Parker
Minister for the Environment
Parliament Buildings
Wellington

Dear Minister

In your letter, dated 16 March 2021, you outlined your expectations for improving intensive winter grazing in Southland. This letter is our first report. It provides an update on our activities in line with your requests.

We have continued to build on from a range of regulatory, monitoring and education initiatives, some of which had been underway for several years. As a consequence, we are seeing strong evidence of good decision-making by farmers, in our aerial surveillance work, with the implementation of expected practices, more consistently across the region.

Attached to this letter, and also being sent directly to you, is a report prepared by the regional sector and the primary sector (Appendix One). The focus on intensive winter grazing has led to stronger alignment in how we share information and work together. Matters of data collection, compliance approaches, engagement and implementation are being discussed and shared to provide support and consistency across the New Zealand.

Intensive winter grazing module

Environment Southland contributed to the development of the MPI/MFE wintering module noting that other similar modules have been developed by industry and community groups.

In Southland, a template was developed by Thriving Southland, who work with catchment groups. Over the past three months Environment Southland staff, in partnership with our industry representatives, have attended over 20 field days and other events where the 'Thriving' module was workshopped with farmers. Our land management staff provided technical expertise, and individual follow-up visits where needed, for attendees. The timing of these workshops meant that most of the discussion was on the current winter period and how to best manage existing crops.

We are now working with farmers to prepare for the coming three to four months, on the 'cultivation period' for winter 2022. Ensuring that farmers are equipped and assisted to make good decisions at this stage, including thinking about how a paddock will perform in very wet weather, is absolutely fundamental to lifting performance during the winter period. Staff will again work with industry and community groups to support field days with a focus on increasing uptake of the IWG module. We are intending to allocate staff to areas where we know there to be either large scale winter grazing, or high winter grazing risks (from sediment and *E. coli* loss).

Cnr North Rd & Price St, Invercargill | DX No. YX20175 | Private Bag 90116, Invercargill 9840 | 03 211 5115 or 0800 76 88 45 | service@es.govt.nz | www.es.govt.nz

We are developing a framework to record the progress that farmers are making. The link to the data collection and storage work happening as part of the Freshwater Farm Plans development is critical.

Practice improvements and monitoring

For the third successive year we worked with industry groups (Dairy NZ and Beef + Lamb NZ) to undertake 'cultivation flights'. This is an aerial approach to checking locations and potential risks of cultivated crop paddocks prior to stock being grazed. (This is separate to the compliance flights we undertake during winter – see Regulatory overview and follow up on page 3.)

Two flights across the Mataura and Oreti catchments were undertaken to identify firstly, where cultivated paddocks that may pose a risk during the winter, and secondly where regulations were not being met. On-ground follow-up visits were focused on paddocks that were poorly selected i.e. paddocks with waterways and critical source areas, on a flood plain or lacking adequate buffer distances from waterbodies.

The two flights this year yielded four follow-up meetings where we worked with the farmers to prepare winter grazing plans, to identify mitigations and/or change to their intended practices. This approach was well received and we noted the co-benefits of positively working with the community and raising awareness of issues outside of the 'stock on crop' period.

Like other Councils we also use social and conventional media to demonstrate and explain to farmers the on-ground actions that are needed to manage IWG.

As well, we developed and shared a simple video clip to assist farmers with the simplest way to measure slope angles whilst out in the field, using ropes, poles and a clinometer. This information allows in-field measurements to be done relatively easily and supports better decision-making for paddock selection and compliance with NES-F slope rules.

As touched on earlier, monitoring change in on-farm behaviour (and practice) is a key area for improvement so that Councils, industry and farmers can demonstrate progress made, and ongoing improvements.

Environmental improvements and monitoring

We are implementing a range of changes to our environmental monitoring programmes over time, starting with a review of our existing baseline and fine scale monitoring programmes to ensure that we can detect the changes to sediment and *E. coli* losses.

This is being undertaken as part of our science strategy development, and transition to a catchment/freshwater management unit approach to achieving freshwater outcomes in Southland.

We know from Wilcock et al (2013)[1] that "monitoring programmes in New Zealand need to be much longer than 10 years to detect changes caused by farmers actions". The adoption of good

[1] Wilcock RJ, Monaghan RM, Quinn JM, Srinivasan MS, Houlbrooke DJ, Duncan MJ, Wright-Stow AW, Scarsbrook MR (2013) Trends in water quality of five dairy farming streams in response to adoption of best practice and benefits of long term monitoring at the catchment scale. *Marine and Freshwater Research* 64, 401–412.

management practices will be critical to achieving improved IWG outcomes, both in Southland and across the country.

This adoption rate needs to continue to improve. We are very clear about that with our community. We do have a very good understanding of losses from winter grazing activities in Southland, at a field or paddock scale. Science studies on wintering practices at Telford, Five Rivers, Tussock Creek and Woodlands, as well as Otago, form a strong basis for the management practices that we now promote.

Finally, we worked with Manaaki Whenua in 2014 and 2017 to use satellite imagery to determine the extent of winter grazing across the Southland region. The information obtained from this work was used to help inform the regulatory framework in the proposed Southland Water and Land Plan notified in 2016. We are developing a scope of work and plan to complete this work for 2021. From the work completed in 2014, we know there are approximately 3,500 properties that had winter grazing crops over an extent of approximately 68,000 hectares.

Regulatory overview and follow up

We have an active aerial surveillance programme where we undertake three compliance flights during winter, and we follow-up all enquiries/complaints that come in via the Environment Southland pollution hotline.

Anecdotally, we have so far observed evidence of increased butters and properly managed critical source areas this winter. Table 1 below outlines the work undertaken over the past three months, once stock has been moved onto crops or are in a break-feeding situation on pasture.

We actively work with MPI staff on the ground in Southland to connect on animal welfare issues and vice versa on environment issues. This strengthened relationship has gained momentum this year and is a very positive step.

We have received three consent applications for intensive winter grazing, most of which relate to large scale farming operations. Applicants have indicated they are 'getting organised early' and preparing their businesses with the knowledge of the likely changes ahead. We know that when the NES regulations for IWG are implemented (irrespective of any changes) there is likely to be a high number of applications received.

To prepare for this, we have linked our mapping and consenting online systems to build a 'decision support tool' – the front facing map brings together a number of spatial datasets to allow farmers to understand the risks of choosing different paddocks. The consenting tool helps farmers determine whether or not a resource consent is needed for their IWG activity and then provides an interactive form to apply for the consent. This initiative will help provide farmers with relevant information and lead to efficiencies from a consenting perspective.

Table 1: Summary of Compliance activities (2019-2021)

	Wintering flight issues to follow up	Environment Southland Pollution Hotline	IWG prosecutions (court outcome finalised)
2021 (to date)	4	19	TBA
2020	19	16	3
2019	95	30	0

Next steps

It has been a relatively wet winter in Southland. We (and our community) know there is still work to do, particularly to lift the performance of some of our farmers who have yet to fully understand the changes required. As we move from the wintering period to the cultivation period, we will be shifting our focus to ensure farmers are prepared for next winter, working with industry and across the regional sector. As outlined above we will maintain our attention on improving IWG, our monitoring, and develop ways to measure environmental change.

We welcome your feedback to this letter, and extend an invitation for you to visit Southland in person to discuss the detail of this report and view firsthand the activities underway.

Yours sincerely

Nicol Horrell
Chairman

Encl